confidential

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MINUTES OF THE PROCEEDINGS

METEOROLOGICAL COMMITTEE,

1870.

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ERRATA.

Page 1. Line 5 from bottom, for Hibernia read Hibernian.
Page 93. Line 1, for 11,131*l.* read 1,131*l.*

MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COMMITTEE.

116, *Victoria Street, January* 10, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Dr. W. A. Miller.
Mr. Gassiot.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, December 20, were read and confirmed.

Read—A report from Mr. Galton, approving of Mr. Beckley's self-registering raingauge.

Read—A letter from Mr. Galton, stating that the drill pantagraph was nearly ready, and applying for a metal plate, exhibiting the scales of the different instruments at the observatories, to be used in that pantagraph, as described in the minutes of last meeting.

Mr. Scott was instructed to procure such a plate from Kew, and to request Mr. Galton to take steps at once to order one of Wagner's pantagraphs without delay.

Resolved—That for the year 1869 the instrumental curves be published as lithographs in order to give time for the completion of the pantagraphs.

That Mr. Scott be empowered to proceed at once to make the necessary arrangements for such publication on such scale as may be found practicable.

That the tabular reductions of the observations at the seven observatories for the year 1869 (Minutes, 1869, p. 61) be put in type forthwith.

Read—The following letter from Capt. Toynbee:—

SIR, December 13, 1869.

AFTER some consideration I have been led to think that the science of Meteorology would be advanced if the Committee were to grant an annual prize (say of a barometer) to each of the training ships for officers in the mercantile marine, viz., the "Conway" in Liverpool, and the "Worcester" in London.

The prize to be granted to the pupil who passed the best examination in the handling of meteorological instruments, and in meteorology generally.

Considering how dependant we are upon the officers of the mercantile marine for observations, and that barometers reading to thousandths, damp bulbs, and hydrometers are not in use on board of ordinary merchant ships, also that the use of them is not taught in most of our navigation schools, it would, I think, be well to supply each of those ships with a set of our instruments for educational purposes.

It frequently happens that an intelligent commander finds our instruments so different from those he has been in the habit of using, that it is some time before he gets into the way of handling them, and cases are not uncommon in which mistaken entries have been made in the logs during whole voyages.

Will you please to lay this suggestion before the Committee?

I am, &c.

HENRY TOYNBEE,
Marine Superintendent.

To R. H. Scott, Esq.

The issue of instruments for the purposes of instruction, and of a barometer as a prize, was approved.

Mr. Scott was instructed to take steps to carry out Capt. Toynbee's suggestions.

Read—A letter from Captain Toynbee, submitting "excellent" logs, kept by Captain Arthur A. Jones, ship "Victoria Nyanza," during a voyage from Liverpool to Valparaiso and back; Captain W. H. Smith, s.s. "Hibernia," Allan Line, Liverpool to Quebec; Captain Isaac C. Gales, ship "Flechero," Newcastle to Valparaiso and back; and recommending that copies of the Admiralty Pilot Charts be presented to Captains Jones and Smith, and a barometer to Captain Gales, who has been for many years an observer for the Meteorological Office, and is now retiring from the sea.

Resolved—That Captain Toynbee's recommendation be complied with, and that letters be written to the respective captains thanking them for their very valuable assistance.

Read—A letter from Captain Richards, stating that in his opinion the wind tables for the Atlantic Ocean (Minutes, 1868, p. 71) were not of sufficient value, owing to paucity of information, to be published.

Resolved—That these tables be not published.

Mr. Scott asked permission to issue the signal lamps for night signals, which are in the hands of the coastguard at several stations, to the authorities at the respective places who receive telegraphic intelligence, in accordance with Circular 278, providing they are willing to bear the cost of keeping up night signals.

Mr. Scott reported that on the 27th December no observations had been taken for the daily weather report in London, owing to the absence of all the observers on leave for the day, and he was directed to guard against the recurrence of a similar omission.

Reported—That Mr. A. D. Spencer had resigned his appointment as temporary clerk. Mr. Scott was authorized to obtain a successor to him.

Reported—That on the 29th December, on the signature of Mr. Gassiot, 1,000*l.* had been withdrawn from the deposit account, London and Westminster Bank, and lodged in the Bank of England.

Also, that on the signature of Mr. Gassiot the following cheques were drawn the 22d December:—

	£	s.	d.
For Salaries for December:—			
R. H. Scott	66	13	4
H. Toynbee	33	6	8
B. Stewart	33	6	8
W. Salmon	18	6	8
J. S. Harding, jun.	14	3	4
R. Strachan	*16	13	4
S. Jeffery (4 weeks to 29th Dec.)	12	0	0
F. Gaster	10	16	8
C. Harding	9	3	4
R. H. Curtis	7	10	0
F. Steventon	7	18	4
J. S. Harding, sen. (4 weeks to 29th Dec.)	7	14	0
E. Magrath " "	5	0	0
A. D. Spencer " "	5	0	0
J. Curtis " "	5	0	0
W. G. James " "	5	0	0
G. G. Francis " "	3	0	0
F. Brodie " "	3	0	0
T. D. Bell (4 weeks to 25th)	3	0	0
The following cheques were drawn the 29th December:—			
For Instruments:			
B. Stewart, Kew, verifications	3	12	0
Negretti & Zambra, F. barometers	24	0	0
For Agencies at ports:			
H. Smart, Liverpool	7	9	6
For Telegraphy:			
Electric Company, October — 78 0 2			
Do. special charges, October — 14 19 4			
Do. " November — 22 11 6			
	115	11	0
Magnetic Company, November	73	12	7
Submarine Company, November	37	12	9
Anglo-American Company, six months' allowance to Heart's Content	6	10	0
United Kingdom Company, November	3	7	6
T. B. Gibbs, signal staff at Exeter	7	0	0
Carried forward	545	7	8

* Including allowance for care of instruments.

	£	s.	d.
Brought forward	545	7	8
For Observatories:			
B. Stewart, Kew—			
Allowances for quarter - - - 112 10 0			
Waxed paper - - - - - 19 11 0			
	132	1	0
D. Thomson, Aberdeen—			
Allowance for quarter	62	10	0
T. R. Robinson, Armagh—			
Allowance for quarter - - - - 33 15 0			
Expenses for „ - - - - 16 14 3			
	50	9	3
W. P. Dymond, Falmouth—			
Allowance for quarter - - - - 66 5 0			
Less waxed paper - - - - 6 10 4			
	59	14	8
R. Grant, Glasgow—			
Allowance for quarter - - - - 62 10 0			
Less waxed paper - - - - 6 10 4			
	55	19	8
S. J. Perry, Stonyhurst—			
Allowance for quarter	50	0	0
T. Kerr, Valencia—			
Salary for December	20	16	8
Expenses during quarter	56	5	5
C. Clouston, Orkney—			
Allowance for quarter	2	10	0
G. T. Watson, Yarmouth—			
Allowance and expenses for quarter	4	4	0
H. Williams, Holyhead—			
Allowance and expenses to 31st December	11	19	9
Standidge and Co., anemograph forms	5	2	0
J. Driscoll, rent of Valencia observatory	25	0	0
For Contingencies:			
C. W. Jacques, rent of office	93	2	6
E. Stanford, advertisements	5	13	9
R. H. Scott, extra work of staff	51	6	3
For Office Petty Expenses:			
J. S. Harding, jun., on account	40	0	0
Total	£1,272	2	7

116, *Victoria Street, January* 17, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.
Mr. Galton. | Dr. W. A. Miller.
Colonel Smythe.

The Director was in attendance.

The Minutes of last meeting, January 10, were read and confirmed.

Submitted—The five-day means of the various meteorological elements from the seven observatories for the period from January 1 to June 29, 1869.

Reported—That the daily means for these elements had been calculated, and it was resolved that these be not printed at present.

Mr. Galton reported the progress that had been made by Mr. Beck in the construction of the drill pantagraph, which he considered very satisfactory.

Mr. Scott reported that he had seen Mr. Malby with reference to the reproduction of the curves by lithography, but that it did not seem likely that the curves could be represented at the requisite scale, with accuracy, by such a process.

Reported—That Herr Wagner, jun., of Berlin, had called at the office on the 17th, and after an interview with Mr. Galton and Mr. Scott, had submitted a tender to make a pantagraph for the sum of 188*l.*, including cost of erection in London, the instrument to be ready by the end of May, which tender had been accepted by Mr. Galton.

Mr. Scott was therefore instructed to order the instrument of Herr Wagner.

A discussion having arisen with reference to the form, &c., of publication of the curves, it was—

Resolved—That on the margin of the plates of curves the graduation in millimetres, and in degrees of the Centigrade scale, be added to those already given in inches and degrees Fahrenheit.

That the plates of curves shall not contain numerical details.

That for the present no tables of the hourly readings of each instrument shall be published.

Reported—That Mr. S. R. Graves, M.P. for Liverpool, had written to the office respecting the meteorological reports from that place, and had requested Mr. Hartnup to place himself in communication with the office, with the view of furnishing daily reports by telegraph from the Bidston observatory, and that negotiations were accordingly in progress.

Mr. Scott reported (Minutes, 1869, p. 114)—That he had engaged Mr. Charles Burton, B.A., as a temporary clerk, at a salary of 1*l.* 15*s.* per week.—Approved.

Reported—That Mr. Galton's model anemometer had been on trial for a month, and appeared to perform very satisfactorily.

Resolved—That the instrument be tested at Kew, and that a report be requested concerning its performance, and concerning the cost of determining the constants for each such instrument.

The following quarterly statement was submitted:—

ACCOUNTS PAID, AND LIABILITIES, TO 31ST DECEMBER 1869.

	Paid.	Salaries and Accounts unpaid now presented.	Estimated Liabilities.
	£ s. d.	£ s. d.	£ s. d.
Salaries - - - -	2,390 5 8	—	—
Instruments, Mercantile Marine - - -	83 17 7	- - -	173 0 0
" Admiralty - - -	99 15 6	- - -	16 0 0
Agencies at Ports - - - -	49 11 10	- - -	0 6 2
Travelling - - - - -	119 16 9	—	—
Telegraphy - - - - -	1,621 8 3	- - -	353 14 0
Observatories, Current Expenses - - -	1,691 18 11	- - -	119 12 9
" Outfit - - - -	350 3 9	—	—
~~Special~~ Printing - - - -	53 5 3	- - -	17 8 0
~~Contingencies~~ - - - - -	1,400 9 8	- - -	20 17 6
Totals - - -	7,860 13 2	—	700 18 5
Grand total -	8,561*l.* 11*s.* 7*d.*		

ROBERT H. SCOTT,
Jan. 17, 1870.

The Committee then adjourned.

116, *Victoria Street, January* 24, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, January 17th, were read and confirmed.

Reported—That the pantagraph had been ordered from Herr Wagner as directed at last meeting.

Reported—That on the 21st inst. one of the clerks had gone to Messrs. Beck's, and had executed by means of Mr. Galton's drill pantagraph some templates of daily curves, which were submitted.

Resolved—That a letter be written to Messrs. De La Rue and Co., requesting the favour of their having some of these templates reduced in their pantagraph for printing.

Read—The following letter:

DEAR SIR, 114, Fenchurch Street, London, January 19, 1870.

YOUR kind favour of the 18th inst. I duly received to-day, and as the committee of the "Worcester" always meet here on the third Wednesday in the month, I had the opportunity of bringing the subject of your letter before them this afternoon.

They will be very happy to avail themselves of the offer of a set of meteorological instruments for the purpose of instruction of the cadets of the "Worcester" in the science of meteorology; and they will (indeed have) instructed our head master, Mr. W. T. Read, to take every opportunity of imparting instruction in this branch of science. The time of the boys is very fully occupied, so that my committee scarcely think there will be much opportunity of making very much progress, excepting with the older boys, who are about leaving.

Your further offer in the name of yourself and co-committee of a prize annually of a marine barometer, as a prize for the pupil who shall pass the best examination in the use of these instruments and in meteorology generally, will, however, be a great inducement for the cadets to exert themselves, and my committee will gladly avail themselves of it.

Allow me in the name of my committee and myself to thank you and your co-committee men and Captain Henry Toynbee for the interest you show in the "Worcester," and for the handsome gifts you make.

As to the scheme of conducting the examinations, I would suggest that the examination is held each Midsummer; and my committee will be glad if Captain Toynbee could conduct such examination, and select the pupil whom he considers entitled to the prize.

I am, &c.
W. M. BULLIVANT,
Hon. Sec.

R. H. Scott, Esq.,
Meteorological Department, 116, Victoria Street.

Mr. Scott was instructed to reply as follows:

SIR, Meteorological Office, 25th January 1870.

IN reply to your letter of the 19th instant, I am instructed by the Committee to inform you that they will be willing to grant permission for some one connected with this office to examine the cadets of the "Worcester" for the proposed premium in meteorology. I shall be happy to arrange the details hereafter.

I am, &c.
ROBERT H. SCOTT.

W. M. Bullivant, Esq.,
Hon. Sec., Training Ship "Worcester."

Submitted—Replies respecting the wind semaphores to the inquiries directed to be made (Minutes 1869, p. 74.) The replies were furnished respectively by—

J. A. W. Harper, Esq., secretary, Lloyd's Salvage Committee, for London;
Graham H. Hills, Esq., marine surveyor, for Liverpool;
The Town Clerk, Tynemouth, for North Shields;

and stated that little attention was paid to the semaphores by seafaring men.

Resolved—That the semaphores be withdrawn.

Read—A letter from Captain H. Toynbee submitting "excellent" registers kept by the following gentlemen:—

Captain P. Petrie, S.S. "Patagonia;"
Captain T. C. Potts, Ship "Tenasserim;"
Captain S. T. S. Lecky, S.S. "Uruguay," S.S. "Halley;"
Captain Banner, Ship "Lady of the Lake;"

and recommending that copies of the Atlantic Pilot Charts be presented to each of the four gentlemen named.

Resolved—That the charts be presented accordingly.

Reported—That in pursuance of permission granted on the 10th inst. (Minutes, p. 2), Mr. Cutts had been appointed a temporary clerk, at a salary of 15*s*. per week, in place of Mr. Spencer.

Submitted—The following Report regarding the records for December 1869, received from the self-recording instruments of the various observatories, and which have been examined at Kew in accordance with the regulations adopted by the Meteorological Committee (see Minutes, December 21, 1868).

ANEMOGRAPH.

Aberdeen.—The anemograph at this station has been in good action during the month, and the records are complete.

The following error was detected and corrected:

In direction—

December 4, 1 p.m., 6, should be 4.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·6
(3.) Residual difference (Aberdeen—Kew)	+0·1	+0·2

Armagh.—The anemograph at this station has been in good action during the month, and the records are complete. No error has been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·3
(3.) Residual difference (Armagh—Kew)	+0·1	0·0

Falmouth.—The anemograph at this station has been in good action during the month of December. On the 13th one of the cups was blown away, and the next day the instrument was out of action from 10.30 a.m. to 5 p.m., whilst a new cup was being fixed and the clock cleaned; a stoppage occurred also on the 23rd at 9.15 a.m., through the clock-weight becoming detached. In all eight hourly values of velocity and seven of direction have been lost. The orientation was examined on the 14th and found correct.

The following errors have been detected at Kew and corrected:

In velocity—

December 8, 10 a.m., 33 should be 39
„ 11 a.m., 42 „ 37

Forty remeasurements of direction and velocity have been made at Kew with the following results;

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·6
(3.) Residual difference (Falmouth—Kew)	+0·1	+0·2

Glasgow.—At this station the anemograph has been in good action during December, but in the majority of the curves the traces are only faint, and in general cases only legible with difficulty. On the 19th the clock was not started until noon; on the 24th until 0.45 p.m, In consequence of this four hourly records of velocity and three of direction are lost. With these exceptions the records are complete.

The orientation was tested on the 29th and found correct.

The following error was detected at Kew, and corrected.

In velocity—

December 29, 10 p.m. 26, should be 36.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·4
(3.) Residual difference (Glasgow—Kew)	—0·1	—0·0

Kew.—At this observatory the anemograph has been in proper action and the records are perfect for December, nor have any errors been detected on re-examination. The orientation was tested at the end of the month and found correct.

Forty remeasurements of direction and velocity have been made with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·0	0·7
(3.) Residual difference ($Kew^1 - Kew^2$)	0·0	−0·2

Stonyhurst.—The Stonyhurst anemograph has been in good action during the month, and the records are quite complete. The orientation was examined on the 20th and found correct.

The following errors have been discovered at Kew, and corrected:

In direction—

December 1, 5 p.m., 29 should be 31.

In velocity—

December 26, 1 p.m., 25 should be 15.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference (Stonyhurst—Kew)	−0·1	−0·2

Valencia.—The Valencia anemograph has been in good action during the month, but the direction trace continues unsatisfactory. The clock stopped from 11 p.m. on the 14th until 11 a.m. on 15th, thereby causing a loss of 12 hours of velocity and 11 of direction; on the 6th the instrument was not started until 0h. 5m. p.m., two hourly traces for both direction and velocity being lost. The clock was dismounted for the purpose of cleaning from 2 p.m. on the 27th to 11 a.m. 28th, in consequence of which 21 hourly records of velocity and 20 of direction were lost.

The orientation was tested on December 2nd, and found correct.

The following errors have been detected at Kew and rectified:

In velocity—

December	2,	4 a.m.,	20 should be	26
,,	,,	8 a.m.,	20 ,,	26
,,	8,	6 p.m.,	20 ,,	26
,,	10,	9 p.m.,	49 ,,	40
,,	8,	5 a.m.,	12 ,,	18
,,	14,	8 p.m.,	55 ,,	45
,,	15,	noon,	29 ,,	37
,,	,,	3 p.m.,	18 ,,	22
,,	,,	10 p.m.,	19 ,,	27
,,	18,	6 p.m.,	39 ,,	30
,,	19,	2 a.m.,	44 ,,	37
,,	,,	3 a.m.,	44 ,,	37
,,	,,	4 a.m.,	50 ,,	40
,,	,,	5 a.m.,	40 ,,	30
,,	,,	9 p.m.,	39 ,,	29
,,	22,	3 p.m.,	34 ,,	24
,,	27,	2 a.m.,	30 ,,	13

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference (Valencia—Kew)	+0·1	+0·2

Barograph.

Aberdeen.—The action of the Aberdeen barograph has been good during the month of December, but the photography has been indifferent throughout. In consequence of a blemish the temperature curve was lost from 11 a.m. on the 3rd to 6 a.m. on the 4th; an approximate trace has been made in pencil, at Kew, and readings obtained from this line. Also the curve from 11 a.m. on the 13th to 3 a.m. on the 14th was too faint for measurement in the ordinary way, and has been inked over and read at Kew. Some of the sheets appear to have bagged on the cylinder to a slight extent. The records are quite complete.

The following error has been detected at Kew and corrected:

In applying residual correction—

December 22, 10 p.m., 29·781 should be 29·981

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0018
(3.) Residual difference (Aberdeen—Kew)	0·0000

The mean monthly difference between simultaneous barograph and standard readings is 0·0024.

Armagh.—The action of the barograph, as well as the photography, for this month have been good. On the 29th the cylinder was started in the wrong place, and in consequence the light fell on the binding rods, and so caused the loss of two hourly values on the morning of the 31st. With this exception, the records are complete.

The following error has been detected at Kew and corrected:

In applying residual correction—

December 23, 9 a.m., 30·336 should be 30·036.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0018
(3.) Residual difference (Armagh−Kew)	+0·0009

The mean monthly difference between simultaneous barograph and standard readings is ·0023.

Falmouth.—The action of the barograph at this station, as well as the photography, for the month of December have been good. The hourly record for 2 p.m. on the 17th was lost, the light being extinguished by breakage of lamp-glass, and the clock stopped at 10 a.m. on the 29th, but a standard reading having been taken at that hour, the value is not lost. The records are otherwise complete.

The following errors have been detected at Kew, and corrected:

In calculating residual correction—

December	2–3,	−·003	should be −·002
„	4–5,	−·008	„ −·009
„	5–6,	−·011	„ −·012
„	8–9,	−·009	„ −·007

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0021
(3.) Residual difference (Falmouth−Kew)	−0·0015

The mean monthly difference between simultaneous barograph and standard readings is 0·0024.

Glasgow.—The action of the Glasgow barograph, as well as the photography, have been good for the month, but the working of the clock has been very unsatisfactory. The light stop on several occasions failed to act, and the clock itself stopped four times. In consequence of the latter, one hourly value on the 3rd, one on the 12th, and one on the 21st, were omitted. The clock was not started on the 9th and 15th until noon, thereby occasioning in all the loss of five hourly records.

The following errors have been detected at Kew, and corrected:

In entry of standard readings—

December	30, 8 p.m.,	29·927	should be 28·927
„	„ 10 p.m.,	29·985	„ 28·985
„	„ mid.,	29·999	„ 28·999

In calculating residual correction

December	5–6,	+·019	should be +·018
„	30–31,	+·006	„ +·005
„	31,	+·002	„ −·002

In applying residual correction—

December 25, 3 p.m., 29·774 should be 29·794

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0019
(3.) Residual difference (Glasgow−Kew)	+0·0013

The mean monthly difference between simultaneous barograph and standard readings is 0·0022.

Kew.—The action of the barograph, as well as the photography, have been good for this month, and the records are complete

The following error has been discovered by examination:

In applying residual correction—

December 23–24, ·000 should be ·002.

Forty remeasurements have been made with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0016
(3.) Residual difference (Kew^1−Kew^2)	−0·0002

The mean monthly difference between simultaneous barograph and standard readings is 0·0021.

Stonyhurst.—The Stonyhurst barograph has been in good action during the month, but the photography on three occasions has been defective.

The records are complete.

The following errors have been detected at Kew and corrected.

In entry of standard readings—

December 27, 4 p.m., 29·425 should be 29·525.

In calculating residual correction—

December	14–15,	+·009	should be +·010
„	23–24,	·000	„ −·001

In applying residual correction—

December	5, 10 a.m.,	29·777	should be 29·977
„	17, 9 p.m.,	29·370	„ 29·377
„	20, 6 a.m.,	29·140	„ 29·040

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0016
(3.) Residual difference (Stonyhurst−Kew)	+0·0006

The mean monthly difference between simultaneous barograph and standard readings is 0·0018.

Valencia.—The action of the Valencia barograph, as well as the photography, have been good for this month. The clock was dismounted on the 28th, at 11 a.m., for the purpose of cleaning, and not replaced until the same hour the following day; readings of the standard were only made during the

interval at the ordinary times of observation, and in consequence 19 hourly values have been lost with this exception the records for December are complete.

The following errors have been detected at Kew and corrected:

In tabulation—

December 30, noon, 29·098 should be 29·198.
„ 31, 3 p.m., 29·196 „ 29·176

The same errors were also found to exist in subsidiary tables for those times and so remained undiscovered by the observer at Valencia.

In calculating residual correction—

December 7–8, −·016 should be −·012
„ 11, −·006 „ −·007
„ 15–16, −·011 „ −·012

In applying residual correction—

December 27, 1 a.m. to 10 a.m. correction of −·007 was applied instead of −·008.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0040
(2.) Mean difference irrespective of sign	0·0017
(3.) Residual difference (Valencia—Kew)	+0·0009

The mean monthly difference between simultaneous barograph and standard readings is 0·0026.

Thermograph.

Aberdeen.—The thermograph at Aberdeen has been in good action, but the photography has been somewhat indifferent. The records for the dry bulb are all complete, but through the action of frost on the wet bulb, readings for the following hours were rendered unreliable. Four hours on the 1st December, one on 3rd, three on 4th, five on 6th, two on 21st, three on 24th, four on 25th, two on 26th, one on 27th, and three on the 29th.

The following errors have been detected at Kew and rectified:

In tabulation—

December 3, 11 a.m., dry bulb, 28·9 should be 29·9
„ 19, 6 a.m., wet bulb, 35·0 „ 35·8

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·12	0·14
(3.) Residual difference (Aberdeen—Kew)	−0·04	−0·02

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
·12	·13

Armagh.—The thermograph at this station has been in good action during the month, and the photography has been good.

The records of the dry bulb are perfect. The wet bulb was out of action through frost for the following times: two hours on the 2nd, one on 3rd, six on 5th, four on the 6th, three on the 21st, three on the 24th, four on the 26th, and three on the 28th.

The following errors were detected at Kew and put right:

In tabulation—

December 5, 1 a.m., dry bulb, 36·7, should be 36·1
„ 10, 9 a.m., „ 48·7 „ 43·7
„ 12, 7 p.m., „ 38·0 „ 39·0
„ 21, 9 p.m., „ 34·1 „ 35·1
„ 27, 9 a.m., „ 28·6 „ 29·2
„ 29, 7 p.m., wet bulb, 41·7 „ 43·0
„ „ 10 p.m., „ 44·4 „ 45·3
„ „ 11 p.m., „ 45·2 „ 46·4

In maximum—

December 5, 2.15 p.m., 36·9 should be December 5, 0.3 a.m., 37·6.

It was found necessary to retabulate at Kew the under-mentioned curves, the original readings having been taken from wrong scale settings.

December 10, wet bulb, 1 a.m. to midnight.
„ 18, dry and wet bulb, and December 25 to December 27, wet bulb.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·14	0·14
(3.) Residual difference (Armagh—Kew)	+ 0·13	+0·12

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·12	0·15

Falmouth.—The thermograph at this station has been in good action; also the photography is good. The records of the dry bulb are quite complete.

There was a failure of light on the wet bulb for 11 hours on the 26th and 27th. It was out of action two hours on the 1st, one on the 4th, two on the 28th, twelve on the 29th, and eight on the 30th.

The values of three hourly records on the 27th rendered doubtful on account of frost.

No error has been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·14	0·10
(3.) Residual difference (Falmouth—Kew)	— 0·04	— 0·04

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·08	0·09

Glasgow.—At this observatory the records of the thermograph have been obtained as usual during December, but both the photography and the working of the clock have been defective on several occasions, and the following blanks occur in the tabulations:—

For both bulbs, readings are lost through the failure of light stop; nine hourly values on the 12th and two on the 13th by stoppage of the clock; three hours were lost on the 8th, and one on the 9th. Another loss of two hours occurred whilst the clock was being cleaned on the 17th. Through a failure of the gas six hourly values of the dry bulb were lost on the 26th; four hours of the wet bulb on the 22nd, six hours on the 23rd, and one on the 28th. The under-mentioned were lost through frost: on the wet bulb, three on December 1st, seven on the 4th, one on the 5th, four on the 6th, one on the 21st, and six on the 25th; in all 23 hourly values of the dry bulb, and 50 of the wet bulb.

No mistakes have been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·11	0·15
(3.) Residual difference (Glasgow—Kew)	—0·05	+0·01

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
·10	·12

Kew.—The thermograph at this observatory has been in good action, and the photography has been good. The dry bulb records are entire, but the following blanks occur in those for the wet bulb, and are due to the action of frost: three hours on the 1st, seven on the 2nd, six on the 3rd, three on the 25th, one on the 27th, one on the 28th, and three on the 29th; one error was detected on examination, viz.:—

In tabulation—

December 24, 3 p.m., dry bulb 38.5, should be 37·5.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·2	0·2
(2.) Mean difference irrespective of sign	0·08	0·09
(3.) Residual difference (Kew^1—Kew^2)	—0·01	—0·01

The mean monthlydifference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·6	0·8

Stonyhurst.—The thermograph at this station has been in good action and the photography good with one exception, viz., on the 23rd December. This sheet was so blackened that the curve was almost invisible, however faint indications remained which were inked out and tabulated at Kew.

Four hourly records of both bulbs were lost on the 19th by a stoppage of the clock.

The light failed on two occasions, causing the loss of two hours trace of the dry bulb on the 28th, and two hourly values of the wet bulb on the 27th and three on the 28th. The wet bulb being partially frozen, readings at the following times were not obtained:

One hour on December 1st, three on the 2nd, one on 3rd, one on the 4th, three on the 5th, four on the 21st, one on the 26th, one on the 28th, and three on the 29th.

No errors have been discovered on examination.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·13	0·13
(3.) Residual difference (Stonyhurst—Kew)	—0·08	—0·09

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
·10	·11

Valencia.—At this station the thermograph has been in good action and the photography good.

The clock stopped six hours on the 5th, one hour on the 21st and four on the 23rd. It was dismounted for cleaning from 10 a.m. until the same hour next day, thereby occasioning in all the loss of 29 hourly values for both bulbs.

The wet bulb was out of action, being frozen, four hours on the 26th, five on the 27th, and two hours on the 28th. An unusual proportion of the standard readings during the month differing from the thermograph readings, it was found necessary to retabulate at Kew the wet bulb curve from 11 a.m. on the 1st to 10 a.m. on the 3rd, and both dry and wet bulb curves from 11 a.m. on the 15th until 10 a.m. on the 17th; for the latter day there is a change in the time scale which is not accounted for.

The following errors have been detected at Kew and corrected:

Maximum—

December 12, 2.20 a.m. 46·6 should be midnight 50·1
„ 14, 0·50 p.m. 48·2 „ 10.15 p.m. 49·5
„ 16, 7.10 p.m. 49·9 „ 7.10 a.m.

Minimum—

December 7, 10.15 p.m. 39·8 should be 0.1 a.m. 36·8
„ 18, 2.2 p.m. 39·0 „ 8.2 p.m. 44·6
„ 26, 3.15 p.m. 34·0 „ midnight 32·6

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·03	0·04
(2.) Mean difference irrespective of sign - -	0·13	0·16
(3.) Residual difference - - - -	−0·02	−0·08

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·16	0·17

In the following table the number of hourly records lost during the month of December is exhibited:

	Anemograph.		Barograph.	Thermograph.			
				Dry Bulb.	Wet Bulb.		
	Direction.	Velocity.			Out of action.	Frost.	Other causes.
Aberdeen - -	0	0	0	0	0	28	0
Armagh - -	0	0	2	0	0	26	0
Falmouth - -	7	8	1	0	25	3	11
Glasgow -	3	4	5	23	0	22	28
Kew - - -	0	0	0	0	0	24	0
Stonyhurst - -	0	0	0	6	0	18	9
Valencia - -	33	35	19	29	0	11	29

The Committee then adjourned.

116, *Victoria Street, January* 31, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.
Mr. Galton. | Dr. W. A. Miller.

Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting, Jan. 24, were read and confirmed.

Submitted—Lithographed proofs, executed by means of the drill pantagraph, of the daily curves for Kew, from January 1–5, 1869, which were approved. Mr. Scott was directed to proceed with the preparation of these curves.

Read the following letter:

School Frigate "Conway,"
3, Union Court, Castle Street, Liverpool, 29th Jan. 1870.

SIR,

I AM desired by the committee of management of the school frigate "Conway" to acknowledge receipt of your communication of the 18th instant, stating that your Committee had, on the suggestion of Captain Henry Toynbee, resolved to sanction the issue, for the use of this training ship, of a set of meteorological instruments, for the purpose of instruction of the pupils in the science of meteorology, and also of the very handsome offer of a barometer annually as a prize to the pupil who shall pass the best examination in the use of the instruments, and in meteorology generally; for which the committee are extremely obliged, and accept with their best thanks to your Committee for their most handsome liberality.

I will shortly communicate to you a scheme for conducting such examination for the approval of your Committee.

Again thanking your Committee for their liberality,

I am, &c.
CLARKE ASPINALL,
Secretary.

R. H. Scott, Esq., Director,
Meteorological Office.

Read—A letter from Dr. Stewart, stating that in order to test satisfactorily Mr. Galton's model anemometer it would be necessary to erect a stand in the grounds of the observatory at Kew.

Resolved—That Dr. Stewart be authorized to expend a sum not exceeding 20*l.* on the erection of such a stand.

Sir E. Sabine submitted a notice of Mr. C. O. Cator's anemometer which he had received. Mr. Scott was instructed to inquire if there has been a report from the Kew Observatory respecting this instrument, and if so to request a copy of it.

Reported—That the issue of telegrams respecting the wind semaphores had been discontinued.

Mr. Scott reported that on Saturday afternoon, the 29th inst., the warning telegrams issued by the office had been refused at the telegraph offices, owing to their not having been prepaid, no reply having as yet been received from the Post Office to the letter respecting the future arrangements for the telegraphic work of the office, written in pursuance of the instructions given by Committee, December 6, 1869.

Mr. Scott further reported that he had at once telegraphed to Mr. Scudamore, who had given orders that all telegrams issued by the office should be received for the present without prepayment.—Action approved.

Reported—That M. Wojeikof had applied for meteorological information relating to the China Seas, to be used in the preparation of a work on the climate of Eastern Asia, to be published by the Central Physical Observatory of St. Petersburg, and that copies of the unpublished mean results in the office had been supplied.—Approved.

Reported—That at the suggestion of Mr. S. R. Graves, M.P. for Liverpool, Mr. Hartnup had written to say that he would probably be able to furnish daily weather reports by telegraph from the Bidston Observatory.

Reported—That the resignation of Mr. Jeayes, who left the office on the 5th July last, had not been entered on the minutes at the time.

Reported—That copies of the weather report have been supplied as follows:

Exeter, two copies, for exhibition.
Patent Office, London, for exhibition.
M. Coumbary, Observatory, Constantinople.
Mr. J. C. Mansell, Longthorns, Blandford.
Meteorological Society of France.

Reported—That the supply of Admiralty pilot charts, for presentation to captains, was nearly exhausted, and permission requested to obtain a further supply.—25 to be ordered.

Resolved—That the sum of 1,000*l.* be transferred from the deposit account, London and Westminster Bank, to the Bank of England.

The following cheques were drawn:

For Salaries for January:—	£	s.	d.
R. H. Scott	66	13	4
H. Toynbee	33	6	8
B. Stewart	33	6	8
W. Salmon	18	6	8
J. S. Harding, jun.	14	3	4
R. Strachan	*16	13	4
S. Jeffery (4½ weeks to 29th Jan.)	13	10	0
F. Gaster	10	16	8
C. Harding	9	3	4
R. H. Curtis	7	10	0
F. Steventon	7	10	0
J. S. Harding, sen. (4½ weeks to 29th Jan.)	8	13	3
C. E. Burton (3 „ „)	5	5	0
E. Magrath (4½ „ „)	5	12	6
J. Curtis	5	12	6
W. G. James	5	12	6
G. Francis	3	7	6
F. Brodie	3	7	6
T. D. Bell (5 weeks „)	3	15	0
J. P. Cutts (1 week „)	0	15	0

			£	s.	d.
For Instruments:					
P. Adie, barometers repaired			38	12	0
W. G. Schoof, barograph repaired			6	0	0
For Expenses at Observatories:					
P. Adie, anemograph scales			4	0	0
W. P. Dymond, Falmouth			5	9	5
T. Kerr, Valencia, salary for January			20	16	8
For Telegraphy:					
Electric Company, November	£88 6 5				
„ December	87 16 10				
			176	3	3
Magnetic Company „			71	15	5
Submarine Company „			37	18	7
G. T. Watson, Yarmouth			1	10	0
For Special Printing:					
Williams and Norgate, books			4	5	6
R. Rivière, binding pilot charts			10	16	0
For Contingencies:					
C. Dunning, office fittings			4	4	2
Priest, Brothers, table			4	0	0
E. Stanford, papers			2	8	5
R. H. Scott, extra work of staff			39	17	0
For Office Petty Expenses:					
J. S. Harding, jun. (on account)			30	0	0
Total			£730	17	2

The Committee then adjourned.

* Including allowance for care of instruments.

116, *Victoria Street, February* 7, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. Galton. | Dr. W. A. Miller.

Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting, January 31, were read and confirmed.

Reported—That the drill pantagraph had been sent home by Messrs. Beck, and erected in the office.

Submitted—The results of the comparison between weather experienced in these islands and the telegraphic intelligence issued by the office during the year 1869, carried out in pursuance of a resolution of Committee (Minutes, 1869, p. 49). Mr. Scott was instructed to continue the comparison.

Reported—That daily weather reports had been issued to—
Dr. S. Elliott Hoskins, Guernsey.
W. E. Michell, New Quay, Cornwall.

The Committee then adjourned.

116, *Victoria Street, February* 21, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.
Mr. Galton. | Dr. Miller.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, Feb. 7, were read and confirmed.

Submitted—A proof of the five-day means of meteorological elements for the first six months of 1869 (Minutes, p. 1). Mr. Scott was instructed to have this table set up, in different forms, for the approval of Committee.

Submitted—Results of experiments made by Dr. Stewart with Beckley's self-recording rain gauge (Minutes, 1869, p. 115). Mr. Scott was instructed to inquire from Dr. Stewart whether he had changed his opinion in any way as to the performance and scientific value of the instrument, and also to ascertain from Mr. Hicks the cost of seven such instruments.

Submitted—Results of the comparison ordered by Committee (Minutes, 1869, p. 60) to be instituted at Kew between Mason's and Regnault's hygrometers.

Submitted—The following correspondence respecting weather telegraphy with France:

MON CHER MONSIEUR, Paris, le 12 Février 1870.

LE Ministre de la Marine vient de décider que les avis de tempêtes adressés à Paris par l'Office Météorologique seraient portés à la connaissance des populations maritimes par le même signal qu'on emploie en Angleterre, c'est-à-dire par le cylindre (drum) qui serait hissé pendant 36 heures dans tous les sémaphores établis sur les côtes nord et ouest de France:

Je m'empresse de vous annoncer cette excellente mesure, à l'adoption de laquelle j'ai été heureux d'employer tous mes efforts; et je viens vous demander de faire, à ce sujet, quelques arrangements bien précis pour que nos marins en tirent tout le parti possible, sans chances d'erreurs.

En ce qui concerne le télégramme d'avertissement, je désirerais d'abord qu'il fût aussi bref que possible; je crois qu'on pourrait supprimer la hauteur du baromètre; nous n'avons pas la même graduation et on éviterait ainsi des erreurs de réductions de la part de nos employés des télégraphes qui ne sont pas, généralement, très savants en langue Anglaise.

Pour la force du vent, vous nous signaleriez seulement le No. d'après l'échelle de Beaufort, et nous le traduirions en Français par les expressions correspondantes ci-après:

7 Forte brise.	10 Coup de vent.
8 Bon frais.	11 Tempête.
9 Grand frais.	12 Ouragan.

En outre, l'avertissement (qui sera le plus souvent compris dans le résumé quotidien) serait toujours placé à la fin de ce résumé et précédé des mots "hoist drum," de manière à ne pas être confondu avec les détails qui le précéderaient.

Les avertissements que vous nous enverrez pourront parfois s'étendre jusqu'à Bayonne; d'autres fois, ils ne s'appliqueront qu'aux côtes nord de France; et alors, vous pourriez nous en envoyer de trois sortes:—

1° Pour nos 2 côtes, de la Manche et de l'Océan
2° Pour nos côtes de la Manche seulement;
3° Pour nos côtes de l'Océan seulement.

Je vous proposerais donc de nous indiquer, chaque fois, à quelles parties de nos côtes l'avertissement est applicable, et de composer définitivement le télégramme d'une des trois manières suivantes:

1°	hoist drum,	two coasts,	south-west,	force 9	Valentia.
2°	do.	Manche	do.	do.	do.
3°	do.	Océan	do.	do.	do.

Ce service ne pourra être organisé que dans 2 ou 3 semaines; d'ici là, nous aurons le temps de nous entendre sur ces conventions.

Nous ferons imprimer et afficher dans tous nos ports un avis qui est simplement une traduction de celui qui a été publié en 1868 par votre office. Je vous en envoie une copie.

Nous inaugurerons en même temps notre nouveau système de dépêches météorologiques dont vous avez le plan détaillé, ainsi qu'un service de signaux faits par nos sémaphores pour informer les pêcheurs, matin et soir, du temps qu'il fait au large.

Veuillez agréer, cher Monsieur, l'assurance de mes sentiments les plus distingués.

G. DE VERNEUIL.

MY DEAR SIR, Meteorological Office, February 15, 1870.

THIS office feels very highly honoured by the information which you communicate in your letter of the 12th, but at the same time I feel the responsibility of warning your coasts south of Brest and L'Orient to be very serious. I fear that many storms will reach you before we shall have been able to give you any notice, as sometimes the area of disturbance barely touches our coasts on its passage across Spain, where we have only Corunna, and that is very irregular. However, we shall do our best, and we cannot do more, and I can only express the hope that ere long you or the observatory at Montsouris will be in a position to issue your own warnings to your western coasts, and not uncommonly to give us warnings. It is only by a complete exchange of information that we can get on.

The form of our warning telegrams will be very short. I send a few specimens. We do not always give the force of the wind, and most commonly we say "barometer rising rapidly" or "falling rapidly" before the wind has attained a higher force than 5 or 6.

Would these telegrams suit you, or do you wish particularly the force of the wind to be stated? I sincerely hope that we may be able to give satisfaction to you and the Marine Ministry, and no efforts on our part shall be wanting to ensure it.

Thanking you most deeply for the kindly feeling you evince towards this office,

I am, &c.,

ROBERT H. SCOTT.

Mr. Scott reported that it had been finally arranged that the French coast should be divided into two districts for the purposes of these telegrams. *North*, Dunkerque to Cherbourg. *West*, Cape La Hague to Nantes.—Approved.

Submitted—The report of the Norddeutsche Seewarte for 1869, containing an analysis of the telegraphic intelligence sent to Hamburg by the Meteorological Office during that year. The result showed that intelligence of almost every storm that reached Hamburg had been received from London before the storm began.

Mr. Scott was instructed to communicate an extract from this report, and a notice of the new arrangements with France to the newspapers.

With reference to the use of night signals on the coast (Minutes, p. 2), Mr. Scott stated that there were 38 sets of lamps, the cost of which was 8*l.* per set. He was instructed to consult with the Board of Trade with reference to the advisability of issuing lamps to 10 stations as an experiment.

Submitted—An application from the divisional officer of coastguard, Carlingford, for the loan of a fishery barometer for that place.—Granted.

Submitted—An application from Dr. Hooppell, head master of the Winterbottom Marine School, South Shields, for the publications of the office, and for the loan of a set of instruments for the use of the school.—Granted.

Read—A letter from Captain Toynbee, recommending Captain Carruthers, ship "Minero," whose register he submitted, for a presentation copy of the Atlantic Pilot Charts.—Granted.

Mr. Scott reported that as Mr. Chas. Burton, one of the temporary clerks, had had an operation performed on his palate, he had ventured to give him leave of absence for a fortnight, and had further permitted him to carry on his work at home until he was quite recovered.—Sanctioned.

Submitted—The following report regarding the records for January 1870, received from the self-recording instruments of the various observatories, and which have been examined at Kew in accordance with the regulations adopted by the Meteorological Committee (see Minutes, 21st December 1868).

ANEMOGRAPH.

Aberdeen.—The anemograph at this station has been in good action; on starting the instrument on the 21st January the clock lines were disarranged, and in consequence there was no record for the succeeding 24 hours. No other blanks occur during the rest of the month.

The orientation was tested on the 22d January and found correct.

No error has been discovered at Kew on examination.

Forty remeasurements of direction and velocity have been made with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·9
(3.) Residual difference (Aberdeen—Kew)	0·0	0·1

Armagh.—The instrument at this station has been in good action, and the records are complete. The following errors have been discovered at Kew and corrected:

In tabulation—

January 29, 3 p.m., 16 should be 26.
„ 30, 5 a.m., 44 „ 34.
„ „ 6 a.m., 23 „ 33.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	1·0
(2.) Mean difference irrespective of sign	0·4	0·2
(3.) Residual difference (Armagh—Kew)	+0·2	0·0

Falmouth.—The anemograph at this station has been in good action during the month of January, and the records are complete, excepting one hourly value of the velocity lost on the 17th, at which time the orientation was tested and found correct.

No error has been discovered at Kew by examination.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·0	0·6
(3.) Residual difference (Falmouth—Kew)	0·0	0·0

Glasgow.—At this observatory the anemograph has been in good action during January, and the records are complete.

The velocity trace was very faint in some of the earlier curves, but improved considerably towards the end of the month.

No error has been detected at Kew on examination.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·7
(3.) Residual difference (Glasgow—Kew)	0·0	+0·1

Note.—Regarding last month's report the anemograph clock was cleaned on the 19th and 24th December.

Kew.—At this observatory the anemograph has been in good action. On the 1st January the velocity shaft became unclamped, and remained out of order until 10 a.m. on the 3d; owing to this 46 hourly values of velocity are lost.

One hourly value of both velocity and direction was lost whilst testing the orientation and oiling the instrument on the 1st January.

No error has been discovered on examination.

Forty remeasurements of direction and velocity have been made with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·6
(3.) Residual difference (Kew^1—Kew^2)	—0·1	—0·3

Stonyhurst.—At this station the anemograph has been in good action; however, both traces are somewhat faint, and on the 9th the velocity pencil failed to mark entirely for five hours.

The orientation was examined on the 18th and proved to be correct.

The following error in velocity was found and corrected at Kew:

January 8, 3 a.m., 24 should be 34

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·6
(3.) Residual difference (Stonyhurst—Kew)	0·1	—0·1

Valencia.—The anemograph at this station has been in good action during the month, and the records are complete.

On January 27th the cylinder was started, so that the traces were marked until 4 p.m. on the wrong end of the sheet, this, however, was put right. Hour lines have been marked in pencil and tabulations made from them, so that values were obtained for the hours when it was going wrong.

The orientation was examined on the 16th January and found right.

The following errors have been discovered at Kew and corrected:

In velocity—

January	5,	2 p.m.,	14	should be	28
„	„	6 p.m.,	18	„	28
„	6,	9 p.m.,	31	„	25
„	7,	8 p.m.,	53	„	60
„	„	10 p.m.,	67	„	57
„	8,	7 a.m.,	49	„	43
„	13	7 a.m.,	46	„	40
„	„	10 p.m.,	41	„	35
„	20,	5 a.m.,	16	„	10
„	„	10 a.m.,	17	„	7
„	„	11 a.m.,	19	„	9
„	23,	10 a.m.,	8	„	15
„	28,	mid.	49	„	42

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·4
(3.) Residual difference (Valencia—Kew)	—0·0	—0·0

Barograph.

Aberdeen.—The barograph at this observatory has been in good action during the month, the photography has been fair, and the records are complete.

The following error has been discovered at Kew and corrected:

In applying residual correction—

January 6th, 9 p.m., 29·181 should be 29·081

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0021
(3.) Residual difference (Aberdeen—Kew)	0·0000

The mean monthly difference between simultaneous barograph and standard readings is ·0025.

Armagh.—The action of the barograph, as well as the photography, for the month of January have been good. The bagging has almost disappeared The records are quite complete.

The following errors have been detected at Kew and corrected:

In entry of standard readings—

January 8th, 8 a.m., 29·481 should be 28·481.
„ „ 2 p.m., 29·679 „ 28·679.

In calculating residual correction—

January 8th, +·027 should be +·029.
„ 9th, +·027 „ +·029.

In applying residual correction—

January 7th, 5 p.m., 29·984 should be 28·984.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0017
(3.) Residual difference (Armagh—Kew)	−0·0009

The mean monthly difference between simultaneous barograph and standard readings is 0·0023.

Falmouth.—At this station the action of the barograph has been good for the month. The photography has been very good, and the records are complete.

The following errors have been detected at Kew and corrected:

In calculating residual correction—

January 3– 4, −·003 should be −·002
„ 10–11, −·012 „ −·013

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0021
(3.) Residual difference (Falmouth—Kew)	+ 0·0008

The mean monthly difference between simultaneous barograph and standard readings is 0·0022.

Glasgow.—At this observatory the action of the barograph has been satisfactory, and the photography has been good. There have been two failures of gas, the one from 4 a.m. to 10 a.m. on January 1st, and the other from 2 a.m. to 10 a.m. on January 8th. The clock stopped on January 27th from 1 a.m. to 10 a.m.

In all 21 hourly values have been lost. The light-stop omitted to act on one occasion.

The following errors have been detected at Kew and set right:

In entry of standard readings—

January 28, 10 a.m., 29·971 should be 29·771

In calculating residual correction—

January 1 +·002 should be −·002
„ 12–13, +·005 „ +·003
„ 14–15, +·007 „ +·005
„ 16–17, +·013 „ +·012
„ 20–21, +·010 „ +.012
„ 30–31, +·006 „ +·007

In applying residual correction—

January 27, 4 p.m., 29·928 should be 29·918

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0025
(3.) Residual difference (Glasgow—Kew)	−0·0002

The mean monthly difference between simultaneous barograph and standard readings is ·0024.

Note.—Regarding last month's report, the barograph clock was being cleaned on the 9th and the 15th of December.

Kew.—The action of the barograph at this observatory as well as the photography has been good for this month, and the records are complete.

The following error was discovered on examination in calculating residual correction:

January 13–14, −·006 should be +·006

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0021
(3.) Residual difference (Kew^1−Kew^2)	+0·0014

The mean monthly difference between simultaneous barograph and standard readings is ·0021.

Stonyhurst.—The barograph at this station has been in good action during this month, and the photography has been good. The records are quite complete. Indications of bagging appear on some curves.

The following errors have been corrected at Kew:

In entry of standard readings—

January 9, 10 a.m., 29·933 should be 28·933
„ „ 29·549 „ 29·460

In applying residual correction—

January 29, 11 a.m., 29·690 should be 29·700
„ 3 p.m., 29·650 „ 29·660
„ 5 p.m., 29·660 „ 29·670

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0020
(3.) Residual difference (Stonyhurst−Kew)	−0·0011

The mean monthly difference between simultaneous barograph and standard readings is ·0018.

Valencia.—The action of the barograph as well as the photography have been good for this month. There have been, however, several failures of light, owing to the lamp smoking. In consequence of this six hourly values were lost on January 5th, four on the 7th, five on the 8th; in all, 15.

The following errors have been detected at Kew and corrected:

In calculating residual correction—

January 5– 6, −·012 should be −·013
„ 16–17, −·020 „ −·021
„ 24, −·013 „ −·017

In applying residual correction—

January 10, 1 to 10 a.m., −·011 applied instead of −·014
„ 12, 10 p.m., 29·889 should be 29·879.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0019
(3.) Residual difference (Valencia−Kew)	+0·0008

The mean monthly difference between simultaneous barograph and standard readings is ·0024.

Thermograph.

Aberdeen.—The thermograph at Aberdeen has been in good action, and the photography has been fair. The following blanks occur in the records for the month:—Dry bulb, four hours on the 16th, gas being out; one hour on the 25th, from the same cause; and one hour on the 28th, whilst the clock was being cleaned. For the wet bulb, the readings at the following hours were rendered useless by frost; two on the 10th, two on the 11th, ten on the 12th, eight on the 26th, two on the 27th, three on the 29th, and three on the 30th. One hour was also lost on the 28th for the same cause as the dry bulb.

The light-stop failed to act on several occasions, but was rectified on the 28th.

No errors have been discovered at Kew on examination.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·10	0·09
(3.) Residual difference (Aberdeen−Kew)	+0·06	−0·09

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·9	0·12

Armagh.—The thermograph at this station has been in good action during the month, and the photography has been good. On the 1st January the cylinder was started in a wrong position, and in consequence two hourly records for both bulbs are lost; with this exception, the dry bulb records are complete. Numerous failures occur in the wet bulb readings, which were caused by the action of frost, viz., two on the 10th, seventh on the 20th, 17 on the 21st, 11 on the 22d, one on the 24th, three on the 25th, seven on the 26th, and five on the 27th.

The following errors were detected at Kew and put right:

In tabulation—

Jan. 9,	3 p.m., dry bulb,	41·7 should be	40·7
	5 p.m., wet bulb,	36·0 „	35·0
11,	3 p.m., „	38·6 „	37·3
12,	5 p.m., dry bulb,	34·6 „	33·8
23,	11 a.m., „	38·9 „	38·3

The minimum on the 18th, 36·0 at 8.45 p.m., should be 40·0.

It was found necessary to retabulate at Kew both dry and wet bulb traces from 1 a.m. on the 7th to 10 a.m. on the 8th; the original measurements were obtained from an incorrect standard reading.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·16	0·13
(3.) Residual difference (Aberdeen—Kew) - -	−0·13	−0·12

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·15	0·14

Falmouth.—At this station the thermograph has been in good action, and the photography has been good. In consequence of a stoppage of the clock on the 9th, five hourly values of both bulbs were lost, and one hour is also lost on the 14th by the instrument not being started until after 11 a.m. The wet bulb was out of action two hours on the 12th, four hours on the 23d, two on the 24th, and one on the 26th; and it was frozen for eight hours on the 20th, 15 on the 22d, and three on the 23d. In addition, three hourly values of both dry and wet bulbs were lost on the 22d whilst the instrument was undergoing repair.

No error has been detected at Kew on examination.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·2	0·2
(2.) Mean difference irrespective of sign - -	0·08	0·09
(3.) Residual difference (Falmouth—Kew) - -	−0·02	+0·01

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·05	0·07

Glasgow.—At this observatory the thermograph has been in good action, and the photography has been good. The records for the dry bulb are complete. Three hourly values of the wet bulb were lost on the 27th by insufficient light, and there are numerous failures due to frost, viz., five hourly values on the 12th, two on the 20th, six on the 21st, six on the 22d, one on the 24th, four on the 25th, and five on the 26th.

The following error has been discovered at Kew and set right:

January 22, 5 a.m., dry bulb 32·9 should be 32·4.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·11	0·12
(3.) Residual difference (Glasgow—Kew) - - -	−0·01	−0·06

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·09	0·11

Kew.—The thermograph at this observatory has been in good action, and the photography has been good with two exceptions, and in one instance that of the curve taken off on the 28th, in which case it was found impossible to tabulate either dry or wet curves from 11 a.m. on the 26th to 10 a.m. on the 28th, and in consequence 40 hourly values are lost. Two values for both are also lost on the 10th by failure of gas. The wet bulb was out of action by frost for two hours on the 11th, 13 on the 22d, seven on the 23d, one on the 25th, eight on the 29th, and two on the 30th.

No error has been discovered by re-examination.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·2	0·2
(2.) Mean difference irrespective of sign - -	0·06	0·07
(3.) Residual difference (Kew^1—Kew^2) - -	+0·03	+0·02

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·09	0·09

Stonyhurst.—The thermograph at this station has been in good action, and the photography has been good with two exceptions—the sheet taken off on the 18th being too indistinct for tabulation, and that taken off on the 26th was traced over before being tabulated at Kew, causing in all the loss of 40 hourly values. The wet bulb out of action through frost for the following times: five hours on the 10th, one on the 20th, five on the 21st, five on the 23d, five on the 24th, nine on the 25th, two on the 26th, four on the 27th, one on the 28th, four on the 29th, and two on the 30th.

No error has been discovered at Kew by examination.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·09	0·12
(3.) Residual difference (Stonyhurst—Kew) - -	+0·03	−0·03

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·09	0·12

Valencia.—At this station the action of the thermograph has been good, and the photography has also been good. The records for both bulbs are complete.

The following errors have been discovered at Kew and corrected:

In entry of standard readings—

January 4,	4 p.m.,	wet bulb,	40·9	should be 41·9
„ 10,	10 a.m.,	„	47·8	„ 37·8
„ 11,	10 a.m.,	dry bulb,	38·9	„ 48·9
„ 18,	10 a.m.,	„	48·3	„ 48·2
„ 26,	4 p.m.,	„	41·8	„ 42·8

The minimum on the 7th should read 1·55 a.m., instead of 1 p.m.

It was found necessary to retabulate at Kew both dry and wet curves from 6th, 11 a.m., to the 8th, 10 a.m., and there appear to be in several cases considerable differences between the standard and thermograph readings for the same times.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·4
(2.) Mean difference irrespective of sign - -	0·14	0·14
(3.) Residual difference (Valencia—Kew) - -	+0·07	+0·01

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·21	0·22

In the following Table the number of hourly records lost during the month of January is exhibited:—

	Anemograph.		Barograph.	Thermograph.			
				Dry bulb.	Wet Bulb.		
	Direction.	Velocity.			Out of action.	Frost.	Other causes.
Aberdeen - -	24	24	0	6	0	30	1
Armagh - -	0	0	0	2	0	53	2
Falmouth - -	0	1	0	6	9	26	6
Glasgow - -	0	0	21	0	0	29	3
Kew - - -	1	47	0	42	0	33	42
Stonyhurst - -	0	5	0	40	0	43	40
Valencia - -	0	0	15	0	0	0	0

The Committee then adjourned.

116, *Victoria Street, February* 28, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Dr. W. A. Miller.
Mr. Gassiot.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, February 21, were read and confirmed.

Read—A letter from Dr. Stewart, stating that he considered Beckley's self-recording rain-gauge to be satisfactory.

Also, a letter from Mr. Hicks, stating the cost of the gauge to be 27*l.*

Resolved—That the observatories be supplied with these gauges, subject to certain alterations suggested by Mr. De la Rue and Mr. Galton.

Mr. Scott stated that as the barometers now supplied for use in the Navy were almost exclusively those packed with india rubber for standing gun-fire, as arranged by Admiral FitzRoy, a large stock of old Kew pattern barometers belonging to the A. account had accumulated, and he requested permission to transfer 24 of these barometers, numbered as below, with 12 aneroids, 10 minimum and 14 maximum thermometers, (the latter superseded by instruments better fitted for use on board ship,) from the Admiralty account to the Mercantile Marine account.

24 Barometers, Adie:—A. 363, 365, 370, 372, 380, 381, 382, 391, 398, 399, 403, 405, 407, 409, 411, 413, 414, 415, 420, 421, 422, 425, 427, 429.

Estimated value in their present broken and defective state, 24*l.*

12 Aneroids:—IX. 16173, 19681, 20971, 21184, 21268, 21663, 21673, 21680, 22070, 22077, 23751.

Estimated value in present condition, 12*l.*

24 Thermometers:—Minimum, 26, 1980, 1996, 2207, 2213, 2217, 2219, 2225, 2227, 2233; Maximum, 29, 2610, 2705, 2709, 2712, 2727, 3013, 3019, 3020, 3029, 3038, 3039, 3049, 5778.

Estimated value, being old, 6*l.*

The proposed transference was approved.

Read—A letter from Mr. Falconer requesting permission to have certain observations from Malta, now in the office, copied at his own expense.—Sanctioned.

Read—A letter from Captain Toynbee, submitting a register kept by Captain John A. Martyn, S.S. "Siberia" and "Samaria," Cunard Line. Captain Martyn (Minutes, 69, pp. 21 and 61) has already received the Pilot Charts, and the register now submitted is even of superior excellence to his previous ones.

Mr. Scott was instructed to write to Captain Martyn, expressing the warmest thanks of the Committee for his valuable co-operation.

Submitted—I. The Tabular Reductions of the observations at the seven observatories for the year 1869, complete (Minutes, 69, p. 61).

II. The Weather Chronicle for the month of January 1869 (Minutes, 69, p. 105).

III. The templates for barograms and thermograms for the first five days of 1869, for Glasgow and Stonyhurst.

Mr. Scott was instructed to send these to press at once.

The following cheques were drawn:

	£	s.	d.
For Salaries for February:—			
R. H. Scott	66	13	4
H. Toynbee	33	6	8
B. Stewart	33	6	8
W. Salmon	18	6	8
J. S. Harding, jun.	14	3	4
R. Strachan	*16	13	4
S. Jeffery (4 weeks to 26th)	12	0	0
F. Gaster	10	16	8
C. Harding	9	3	4
R. H. Curtis	7	10	0
F. Steventon	7	10	0
J. S. Harding, sen. (4 weeks to 26th)	7	14	0
C. E. Burton „ „	7	0	0
E. Magrath „ „	5	0	0
J. Curtis „ „	5	0	0
W. G. James „ „	5	0	0
G. G. Francis „ „	3	0	0
F. Brodie „ „	3	0	0
T. D. Bell „ „	3	0	0
J. T. Cutts „ „	3	0	0
For Admiralty Instruments:			
J. J. Hicks, repairs	11	6	0
For Telegraphy:			
Magnetic Company, account for January	63	8	0
Submarine do. do.	36	7	0
For Expenses at Observatories:			
T. Kerr (Salary for February)	20	16	8
Hopkins and Williams (Chemicals)	15	6	11
For Outfit of Observatories:			
R. & J. Beck (Drill Pantograph)	90	8	8
For Contingencies:			
R. H. Scott (Extra work of Staff)	37	18	9
For Office Petty Expenses:			
J. S. Harding, jun., on account	30	0	0
Total	£576	16	0

The Committee then adjourned.

* Including allowance for care of instruments.

116, *Victoria Street, March* 7, 1870.

PRESENT:

Dr. W. A. Miller in the Chair.

Mr. De La Rue.	Captain Richards.
Mr. Galton.	Sir E. Sabine.
Mr. Gassiot.	Colonel Smythe.

Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting, February 28, were read and confirmed.

Mr. De La Rue stated that his son had succeeded in preparing a paper suitable for Mr. Beckley's rain gauge; this paper is impervious to water and is capable of receiving a trace mark from a stile made of brass and other metals, under a moderate pressure. Specimens of this paper are in the hands of Mr. Beckley for trial.

Submitted the following notice of motion in the House of Commons, forwarded by Mr. Lefevre, with a request for a reply to it.

MR. STRUTT. Meteorological Committee (Expenditure).

Return showing in what manner the sum of 10,000*l.* voted in Class 4 of the Civil Service estimates 1869-70, under the head of Learned Societies, for the Meteorological Committee (appointed by the Royal Society at the request of the Government to conduct meteorological observations and experiments) has been expended, together with a list of the salaried officers employed under the Committee, with the salary each receives.

(Tuesday, 8th March.

Resolved—That details of the expenditure of the Office from April 1, 1869, to December 31, 1869, be furnished to the Board of Trade, with the list of the salaries paid to each officer.

Reported—That the drill pantagraph had been exhibited at the soirée given by the President of the Royal Society on the 5th instant.

Submitted—Copies of the lithographed barograms and thermograms for all the observatories, for the first five days of 1869.

Resolved—That the plates and type of the Quarterly Weather Report be printed in royal quarto:

750 copies of the plates to be struck off.
500 copies of the letterpress.

Mr. Scott reported that in order to accelerate the work with the pantagraph, he had offered the clerks who were working with it double pay for overtime work (viz. 2*s.* 6*d* per hour), until the month of January 1869 should be completed.

Confirmed.

A discussion having arisen as to the probable rate of work with the pantagraph, it was resolved—

That Mr. Galton be authorized to order a second pantagraph upon the principle of the one already in use, with such improvements as experience shows to be necessary.

Mr. Scott reported that the Duke of Northumberland had kindly consented, at his request, to supply the Office with tracings of the records furnished by the anemograph recently erected at Alnwick Castle.

The Committee then adjourned.

116, *Victoria Street, March* 21, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Mr. Gassiot.
Mr. Galton.	Dr. W. A. Miller.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, March 7, were read and confirmed.

Reported—That the returns of details of expenditure had been forwarded to the Board of Trade as directed at last meeting.

Reported—That a copy of the Minutes from 1869 had been forwarded to the Board of Trade and the Royal Society respectively.

Submitted—Proofs of the tabular reductions for 1869, in various forms, as directed February 21.

A form was selected and Mr. Scott was instructed to have the matter printed in accordance with it.

Read—A letter from the Board of Trade (Minutes, February 21), naming the following stations as suitable for the exhibition of night signals:

Aberdeen.	Liverpool.	Yarmouth.
Leith.	Holyhead.	Tynemouth.
Greenock.	Penarth.	Kingstown.
Morecambe.	Plymouth.	Queenstown.

Submitted—The following correspondence with the Scottish Meteorological Society.

DEAR SIR, Meteorological Office, January 19, 1870.

As the Committee have directed the preparation of a systematic chronicle of our weather, in connection with our observatories and telegraph stations, it has been found advisable to obtain, if possible, additional information, so as to represent more fully the weather felt on our coasts.

The observations we ask for are simply of "Wind," "Cloud," and "Weather." We do not, at present, contemplate the receipt of barometrical and thermometrical readings.

As the stations of your Society are, many of them, in very important positions for furnishing data of the character required, I am instructed by the Committee to inquire whether your council would permit them to request that schedules, of enclosed form, should be filled up at the subjoined 12 stations:—

Stykkisholm.	Reykjavik.
Thorshaven.	Smeaton.
North Unst.	Thirlestane.
Stornoway.	Monach.
Portree.	Eallabus.
Girvan.	Calf of Man.

Possibly the information might be extracted in Edinburgh from the returns sent in regularly to your Society.

At all events, this office would be ready to defray all expenses of copying and postage, and to furnish to any gentlemen who will co-operate with it in its work any published results derived from information so furnished, and also, if necessary, a copy, post free, of the lithographed Daily Weather Report.

If your Society would be willing to render us the service suggested, we should esteem it a special favour if you could kindly back up our applications to the observers, with a special official notice of your own.

Trusting that your council may be disposed to look favourably upon this application,

I remain, &c.

A. Keith Johnston, Esq., LL.D., F.R.S.E. ROBERT H. SCOTT.

MY DEAR SIR, Edinburgh, March 7, 1870.

YOUR letter to Dr. Keith Johnston, dated 19th January, was laid before the council at their first meeting after he received it, when I was requested by the council to say that it would give them sincere pleasure to be of any service to the Royal Society Committee.

The Society's observers, who are in the social position of landed proprietors, clergymen, physicians, schoolmasters, and gardeners, give their valuable services not only gratuitously, but as a sort of favour to the Society, of which in many cases they are members. A good deal of their time is required in observing the instruments twice a day, and in entering the observations from their journal in the Society's schedules; and, in addition to this, not a few calculate the monthly averages of their own observations.

In these circumstances the council do not feel themselves in a position to ask their observers to undertake the labour of filling up other than the Society's schedules, and the more so as, having been asked by the Registrar General for an additional schedule, the council were assured that in some instances this request would be refused.

The council therefore, after due consideration of the matter, regret that they cannot see their way to sanction any direct communication between your committee and the Society's observers. But on the

other hand the council being desirous to give what assistance they can to the Meteorological Office, have instructed Mr. Buchan to supply whatever information is contained in the existing schedules, and to use every endeavour to procure further information from such of the observers as may be disposed to afford it.

I remain, &c.,
THOMAS STEVENSON.

R. H. Scott, Esq.,
Director, Meteorological Department.

Mr. Scott was instructed to reply as follows:

SIR,

I HAVE the honour to acknowledge the receipt of your letter of the 7th inst., and to express the sincere thanks of this committee to your council for their kindness in instructing Mr. Buchan to furnish the office with "whatever information is contained in the existing schedules, and to use every endeavour "to procure further information from such of the observers as may be disposed to afford it." I beg, therefore, to send a supply of forms for the returns requested, and shall be very happy to forward for payment any amount expended in clerical labour or in postage.

In conclusion, I am to assure you that the utmost care shall be taken that the communication of any observations to this office shall not in the slightest degree interfere with the operations of your Society.

Submitted—A letter from the secretary to the school frigate "Conway," containing a plan for conducting the annual examination for the prize barometer granted by this Committee.

Mr. Scott was instructed, in conjunction with Capt. Toynbee, to complete the arrangements for the examination.

Submitted—The following report which was ordered to be printed.

REPORT on the Velocity of Wind, in Miles per Hour, corresponding to the estimated Forces by Beaufort Scale (0 to 12.)

1. Inasmuch as the force of wind in the observations furnished to the Meteorological Office is registered according to two systems, viz., estimation by Beaufort scale, and velocity in miles per hour recorded instrumentally, it was requisite to discover what values of one scale corresponded with those of the other, for the purpose of intercomparing the different records.

2. With this object in view, the force of the wind, as estimated by the light keeper at the Old Harbour Lighthouse, Holyhead, was compared with the indications of the anemometer placed on top of the same lighthouse. The comparisons are 433 in number, and the observations extend from 11th November 1869, to the end of February 1870, for the hours of 8 a.m., noon, 4 p.m., and 10 p.m.

3. As the estimated force is usually made from an observation seldom lasting more than two minutes, while the corresponding anemometrical velocity is the number of miles of wind which passed the instrument from 30m. before to 30m. after the time of estimation, it must necessarily result that from the gusts and lulls which so constantly occur in the wind, many of the separate observations will have attached to them more, and many less, than the true hourly velocity (whatever that may be) which corresponds to them. An average of a large number of observations would, however, eliminate these irregularities, and a value be thus obtained for each force which would very nearly represent in miles per hour, a carefully estimated force by the Beaufort scale.

5. The following is the result of this comparison; and though the observations are certainly not all that could be desired, it is sufficiently satisfactory to show that very good results might be obtained by greater care on the part of the observer.

Force by Beaufort Scale.	No. of Comparisons.	Corresponding average Velocity.	Differences.
0 (calm)	14	4·9	
			5·7
1	48	10·6	
			4·7
2	55	15·3	
			4·0
3	61	19·3	
			4·8
4	48	24·1	
			5·5
5	65	29·6	
			6·4
6	66	36·0	
			7·5
7	55	43·5	
			8·3
8	10	51·8	
			4·6
9	8	56·4	
			5·6
10	3	62·0	
11	No observations.		
12			

6. In forces 0 and 1 the comparisons are inadequate; for in very light airs and calms, as well as in extremely violent winds, great difficulty is found in making a good estimation. It is also very rarely the case that a correctly-made and well kept anemometer registers *no* wind for an hour continuously though perhaps for several *minutes* together the cups will be quite stationary, and during this time the estimation may be made. There is also another consideration to be borne in mind, with respect to *light variable* airs. No matter how variable they may be in direction, they produce but one result on the velocity trace of an anemometer, viz., a certain amount of air registered as having passed the instrument. It thus comes to pass that what was (in considering the motion of the air currents) to all intents a *calm*, might cause a registry of some *few* miles of wind by the anemometer, but from different directions.

7. In forces 9 and 10 the number of observations is obviously insufficient to eliminate even the discrepancies in § 3, which in these cases are largely increased owing to the "squally" character of high winds.

8. Neglecting these forces, therefore, for the present, we observe a remarkable kind of increase in the velocity for the different forces as they stand higher in the scale. The *difference* between them is *not constant* but increases slightly the higher we get; the change in velocity from force 7 to 8 being more than double that from 2 to 3. This is shown by the following table:

Forces.	Beaufort Scale.					
	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8
Change in velocity (Miles) - - -	4·0	4·8	5·5	6·4	7·5	8·8
Excess of change over that for numbers next below.	—	0·8	0·7	0·9	1·1	0·8
Excess of change over that for forces 2 to 3 -	—	0·8	1·5	2·4	3·5	4·3

It here appears that starting from force 2, the change in velocity from each force to the one above it is equal to *about* $\frac{6}{5}$ of the change from the one below it to itself. Thus:

The difference between—

Forces.	Miles.
3 and 4	= 4·8 or $\frac{6}{5}$ of diff. between 2 and 3.
4 „ 5	= 5·5 or $\frac{6}{5}$ „ 3 and 4.

and so on.

This rule is, however defective for the *lower* forces (0 to 2), but shows that a regular ratio probably exists between the velocities corresponding to the different estimated forces, the *correct* value of which may be found with a larger number of more carefully made estimations.

Note.—A similar comparison was made between the anemograph records at Yarmouth, and the estimations on board the "St. Nicholas Gat" light vessel. The observations on board this vessel appear very good and regular, but owing to a local peculiarity in the position of the Yarmouth instrument, a much more extended series of comparisons is necessary.

Submitted—Monthly charts of meteorological data for the south and west coasts of South America.

An estimate for lithographing these charts was ordered to be procured.

Submitted—The following Report regarding the records for February 1870, received from the self-recording instruments of the various observatories, and which have been examined at Kew in accordance with the regulation adopted by the Meteorological Committee (see Minutes, December 21, 1868).

Anemograph.

Aberdeen.—The anemograph at this station has been in good action during the month, and the records are complete.

No error has been detected at Kew.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference - - -	1·0	2·0
(2.) Mean difference irrespective of sign -	0·3	0·8
(3.) Residual difference (Aberdeen—Kew) -	0·0	+0·2

Armagh.—The anemograph at this station has been in good action during the month, and the records are complete.

The following errors have been discovered at Kew and corrected:

In velocity—

February	2, 11 a.m.,	9	should be 19
„	6, 10 a.m.,	23	„ 33
„	10, noon,	24	„ 14
„	10, 1 p.m.,	6	„ 16
„	21, 1 p.m.,	7	„ 17
„	„ 3 p.m.,	17	„ 7

Forty remeasurements have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign		0·4
(3.) Residual difference (Armagh—Kew)	+0·2	0·0

Falmouth.—At this station the anemograph has been in good action during the month of February; so far as regards the direction for which the records are complete, but in consequence of a disarrangement of the gearing the velocity has not been recorded between 8 a.m. on the 13th February and 5 p.m. on 14th, at which hour the instrument was set right; it however became again out of order at 8 p.m., and remained so until 4 p.m., on the 16th February. In all seventy-six hourly values are lost. As the anemographs at all the observatories, excepting Armagh, are liable to derangement from the same cause as the Falmouth instrument, copies have been made of a drawing by Mr. Beckley, and distributed, together with an explanatory note, which will enable the observatories to do away with the source of accident.

No error has been detected at Kew.

The orientation was tested on the 22nd February and found correct.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·3	0·7
(3.) Residual difference (Falmouth—Kew)	—0·1	0·0

Glasgow.—The instrument at this observatory has been in good action. A stoppage of the clock occurred at 7.30 p.m. on the 25th February, and remained undetected until 10 a.m. next morning. In consequence fifteen hourly values of both direction and velocity were lost, otherwise the records are complete.

The following error has been detected at Kew, and corrected.

In direction—

February 23rd, 4 p.m. 5, should be 7.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·7
(3.) Residual difference (Glasgow—Kew)	+0·1	+0·3

Kew.—The anemograph at this observatory has been in good action during the month. On February 12th, one hour's record of both velocity and direction was lost, the pencils not being in contact with the paper, and on the 25th the caps were dismounted for the purpose of altering the bearing according to the plan mentioned with reference to the Falmouth instrument. With these exceptions the records are complete.

No error has been detected on examination.

Forty remeasurements have been made both for direction and velocity with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·5
(3.) Residual difference ($Kew^1 - Kew^2$)	—0·1	+0·1

Stonyhurst.—At this station the anemograph has been in good action during the month, and the records are complete.

No error has been detected at Kew by examination.

Forty remeasurements have been made both for direction and velocity with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·7
(3.) Residual difference (Stonyhurst—Kew)	0·0	0·0

Valencia.—The anemograph at this station has been in good action, and the records are complete. The following errors have been discovered at Kew and set right:

In velocity—

February	1,	3 a.m., 40	should be	33
„	4,	1 a.m., 20	„	26
„	5,	2 a.m., 15	„	26
„	6,	9 a.m., 17	„	32
„	10,	11 p.m., 26	„	20
„	15,	11 a.m., 39	„	29
„	17,	6 a.m., 30	„	23
„	28,	5 a.m., 48	„	42
„	„	9 a.m., 40	„	46

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference (Valencia—Kew)	0·0	0·0

Barograph.

Aberdeen.—The action of the barograph at this station has been good during the month of February. The photography has been fair. The traces from the 7th February to the 11th are very faint. February 7th to 9th was measured at Aberdeen, but the curve 9 — 11 was pencilled out and measurements made at Kew. The records are complete.

No error has been detected at Kew by examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0024
(3.) Residual difference (Aberdeen—Kew)	+0·0002

The mean monthly difference between simultaneous barograph and standard readings is 0·0019.

Armagh.—The Armagh barograph has been in good action, and the photography has been good—with the exception of the loss of seven hourly values on February 12th by the stoppage of the clock. The records are complete.

The following error has been discovered at Kew and set right:

In applying residual correction—

February 24, 5 a.m., 29·063 should be 29·083.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0070
(2.) Mean difference irrespective of sign	0·0022
(3.) Residual difference (Armagh—Kew)	+0·0012

The mean monthly difference between simultaneous barograph and standard readings is ·0024.

Falmouth.—The action of the barograph at this station, as well as the photography, for the month of February, have been good, and the records are complete.

The following error has been discovered at Kew, and set right:

In calculating residual correction—

February 17th, —·010 should be —·011

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0020
(3.) Residual difference (Falmouth—Kew)	—0·0001

The mean monthly difference between simultaneous barograph and standard readings is 0·0020.

Glasgow.—The action of the Glasgow barograph, as well as the photography, have been good during the month. Five hourly values were lost on the 7th February, gas having failed, and one on the 22nd by stoppage of the clock. With these exceptions the records are complete.

The following errors have been detected and corrected:

In applying residual correction—

February	13,	2 p.m.,	30·263	should be 30·363
„	17,	8 a.m.,	30·112	„ 30·122
„	„	11 a.m.,	30·143	„ 30·133
„	21,	8 a.m.,	29·645	„ 29·545
„	„	9 a.m.,	29·629	„ 29·529
„	26,	1 p.m.,	29·136	„ 29·156

In calculating residual correction

February 27, —·004 should be —·003

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0022
(3.) Residual difference (Glasgow—Kew)	+0·0009

The mean monthly difference between simultaneous barograph and standard readings is 0·0017.

Kew.—The action of the barograph, as well as the photography, have been good for this month, and the records are complete with the exception of one hourly value on February 12, when the gas failed.

The following errors have been detected by examination:

In tabulation—

February 8, 10 a.m., 29·508 should be 29·558.

In calculating residual correction—

February 13, +·005 should be +·007.

Forty remeasurements have been made with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0015
(3.) Residual difference (Kew^1—Kew^2)	—0·0003

The mean monthly difference between simultaneous barograph and standard readings is 0·0018.

Stonyhurst.—The action of the barograph as well as the photography have been good for this month and the records are complete.

The following errors have been detected at Kew with the following results:

In entry of standard readings—

February 5, 8 a.m., 29·363 should be 29·263
„ 15, noon, 29·993 „ 30·003
„ 16, 6 p.m., 29·858 „ 29·758

In tabulation—

February 5, 8 a.m., 29·269 should be 29·259.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference - - - -	0·0050
(2.) Mean difference irrespective of sign - -	0·0019
(3.) Residual difference (Stonyhurst—Kew) - -	0·0008

The mean monthly difference between simultaneous barograph and standard readings is 0·0019.

Valencia.—The Valencia barograph has been in good action during February, and the photography has been good.

There are no blanks in the records.

An error in applying residual correction of +·001 as −·001 during the morning of the 3rd was corrected at Kew.

Forty remeasurements have been made with the following results:

(1.) Greatest difference - - - -	0·0070
(2.) Mean difference irrespective of sign - -	0·0025
(3.) Residual difference (Valencia—Kew) - -	+0·0012

The mean monthly difference between simultaneous barograph and standard readings is 0·0026.

Thermograph.

During the month of February, the temperature of evaporation has been frequently much below 32°, while at the same time a stormy wind has been blowing. In consequence of this much difficulty in keeping the wet bulb coated with ice has been experienced at many of the observatories.

Aberdeen.—The thermograph at this observatory has been in good action during February, and the photography is good, though some of the sheets are slightly discolored. The dry bulb reading for 11 p.m. of the 15th has been lost in consequence of a photographic blemish, also four hourly tabulations on the 17th have likewise been lost in consequence of the cylinder being under repair. Of the wet bulb, two tabulations have been lost, viz., 11 p.m., and midnight on the 15th, on account of a photographic blemish, and four hours on the 17th through the cylinder being under repair. Sixteen readings have been rejected on account of frost, and 11 rendered doubtful.

The records are otherwise complete.

The wet bulb curve from February 9th, 11 a.m. to February 11th, 10 a.m., has been tabulated at Kew, but no error has been detected.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·11	0·13
(3.) Residual difference (Aberdeen—Kew) - -	−0·10	−0·05

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·09	0·13

Armagh.—The thermograph at this station has been in good action during the month, and the photography has been good.

Twelve hourly tabulations, from 10 p.m. of the 11th to 9 a.m. of the 12th, have been lost for both instruments on account of the clock having been allowed to run down; the dry bulb records are otherwise complete. Of the wet bulb, besides those lost on account of the clock running down, 22 readings have been lost and 13 rendered doubtful on account of frost. The records are otherwise complete.

The following errors have been detected in tabulation and put right:

February 11, 3 a.m., dry bulb, 29·8, should be 30·5
„ „ „ wet bulb, 29·0 „ 29·4
„ 26, 3 p.m., dry bulb, 40·4 „ 41·0
„ 28, 8 p.m., wet bulb, 45·9 „ 44·9

Also the maximum temperature of February 27th should be 46·5 at 11 p.m. instead of 46·2 at 6h. 4m. p.m.

The wet bulb from February 25th, 11 a.m. to 27th, 10 a.m., has been retabulated at Kew, the first tabulations having been made from an erroneous setting of the scale.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·12	0·13
(3.) Residual difference (Armagh—Kew) - -	+ 0·05	+0·05

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·13	0·18

Falmouth.—The thermograph at this station has been in good action during the month; and the photography has been good.

The dry bulb records are quite complete.

Of the wet bulb records 30 hourly tabulations have been lost and 110 rendered doubtful owing to frost; this is a very large number. Fourteen hourly tabulations have likewise been lost on account of the wet bulb being out of action.

No errors have been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet
(1.) Greatest difference - - - - -	0·2	0·2
(2.) Mean difference irrespective of sign - - -	0·10	0·07
(3.) Residual difference (Falmouth—Kew) - -	− 0·01	+ 0·06

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·08	0·06

Glasgow.—The thermograph at this station has been in good action during the month, and the photography has been good.

The dry bulb records are quite complete.

Of the wet bulb tabulations, 59 have been lost and 31 rendered doubtful on account of frost. The records are otherwise complete.

No errors have been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - - -	0·14	0·12
(3.) Residual difference (Glasgow—Kew) - -	+0·05	+0·05

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
·10	·13

Kew.—The thermograph at this station has been in good action during the month, and the photography has been good. The dry bulb records are quite complete. Of the wet bulb tabulations 23 have been lost and 36 rendered doubtful on account of frost; two readings have likewise been lost on account of the gas being low. No errors have been detected.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·2	0·2
(2.) Mean difference irrespective of sign - - -	0·09	0·09
(3.) Residual difference (Kew^1—Kew^2) - -	−0·06	−0·06

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·4	0·8

Stonyhurst.—The thermograph has been in good action during the month, the photography has also been good. The dry bulb records are quite complete. Of the wet bulb readings 22 hourly tabulations have been lost and 11 rendered doubtful on account of frost. The records are otherwise complete.

No errors have been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·9	0·10
(3.) Residual difference (Stonyhurst—Kew) - -	−0·07	−0·03

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
·08	·10

Valencia.—The thermograph at this station has been in good action during the month, the photography has also been good. There was a stoppage of the clock from 1 to 7 p.m. on the 16th, in consequence of which five hourly tabulations have been lost for both instruments; the dry bulb records are otherwise complete. Of the wet bulb, seven hourly tabulations have been lost and one rendered doubtful on account of frost; the records are otherwise complete.

The following errors have been detected at Kew and put right:

In entry of standard readings—

February 4th, 10 p.m., dry bulb 44·1 should be 41·1
" " " wet bulb 39·5 " 39·2

In maximum

February 18, 39·9 at 10 p.m., should be 40·2 at 11.30 p.m.
" 19, 44·8 at 1.30 a.m., " 43·2 at 2.5 p.m.

Besides this there were several slight stoppages.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·03	0·04
(2.) Mean difference irrespective of sign - -	0·09	0·16
(3.) Residual difference (Valencia—Kew) - -	−0·04	−0·09

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·16	0·18

In the following Table the number of hourly records lost during the month of February is exhibited:

	Anemograph.		Barograph.	Thermograph.				
	Direction.	Velocity.		Dry Bulb.	Wet Bulb.			
					Out of action.	Frost.		Other causes.
						Lost.	Rendered doubtful.	
Aberdeen -	0	0	0	5	0	16	11	6
Armagh -	0	0	7	12	0	22	13	12
Falmouth -	0	76	0	0	14	30	110	0
Glasgow -	15	15	6	0	0	59	31	0
Kew - -	1	4	1	0	0	23	36	0
Stonyhurst -	0	0	0	0	0	22	11	0
Valencia -	0	0	0	5	0	7	1	5

Submitted—The following list of errors detected in the office in using the tabulations of 1869.

	Barographs; errors and corrections.		Thermographs; errors and corrections.
GLASGOW:	Time.		
Jan. 28th -	Midnight	29 in. put for 28 in. A.	—
April 7th -	1 p.m.	- - - -	37·0 put for 38·0 wet bulb.
July 4th -	4 p.m.	- - - -	67·7 „ 57·7 dry bulb.
STONYHURST:			
March 1st -	Midnight	28·727 put for 28·734 A.	—
„ 2d -	4 p.m. to midnight.	28 in. „ 29 in. B.	—
June 12th -	- -	- - - -	Reading for maximum 49·6, better 59·6.
ABERDEEN:			
Jan. 16th -	5 p.m.	29·843 put for 29·813 A.	—
Feb. 14th -	7 p.m.	29·657 „ 29·857 B.	—
March 7th -	Noon to midnight.	30 in. „ 29 in. A.	—
May 23d -	1 a.m.	29·750 „ 29·760 A.	—
June 21st -	- -	- - - -	Reading for maximum 52·0, better 57·0.
KEW:			
March 6th -	7 p.m.	30·195 put for 30·295 T.	—
April 15th -	6 a.m.	29·988 „ 29·788 A.	—
June 5th -	10 a.m.	- - - -	68·0 put for 63·0 dry bulb.
May 9th -	- -	- - - -	Reading for minimum 45·6, better 44·9.
Dec. 18th -	- -	- - - -	„ „ 34·6, „ 42·6, curve examined.
FALMOUTH:			
Feb. 26th -	8 p.m.	30·159 put for 30·059 T.	—
April 20th -	11 a.m.	29·850 „ 29·650 B.	—
June 14th -	7 a.m.	29·262 „ 29·362 B.	—
ARMAGH:			
August 7th -	7 p.m.	29·935 put for 29·735 A.	—
„ 8th -	1 a.m.	29·9665 „ 29·665 A.	—
July 4th -	- -	- - - -	Reading for minimum 55·7, better 54·7.
„ 8th -	Noon	- - - -	67·4 put for 57·4.
VALENCIA:			
Jan. 4th -	- -	- - - -	Maximum and minimum in each other's place.

A. Indicates error in corrected column.
B. „ „ altered at Kew.
T. „ tabulation.

Reported—That the property of the Committee at the office had been insured in the "General" Insurance Office in the sum of 1,000*l.*, viz., furniture and fittings, 700*l.*, printed books, 100*l.*, instruments, 200*l.*, MSS. books not insurable.

Approved.

The Committee then adjourned.

116, *Victoria Street, March* 28, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Capt. Richards.
Mr. Gassiot.	Col. Smythe.
Dr. Miller.	Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting, March 21, were read and confirmed.

Reported—That the letter to the Scottish Meteorological Society, adopted at last meeting, had been forwarded on the 22d instant.

Read the following letter:—

Board of Trade, Whitehall Gardens,

SIR, METEOROLOGICAL. March 23, 1870.

I AM directed by the Board of Trade to transmit to you, for the information of the Meteorological Committee, the accompanying copy of a letter from Mr. Lyon Playfair, M.P., forwarding a memorial from the Council of the Scottish Meteorological Society*, applying for Government aid towards the objects of the society.

Before taking these papers into further consideration, this board will be glad to be furnished with such observations as the Committee may be in a position to offer with reference to the objects of the Scottish Meteorological Society, with especial reference to the extent to which they tend to supplement the objects of the Committee.

I am, &c.

R. H. Scott, Esq., Meteorological Office. (Signed) THOMAS GRAY.

The following reply to the Board of Trade was adopted:—

I am instructed by the Committee to inform you that the objects for which the Scottish Meteorological Society was founded are stated in the report presented to the society on the 18th of January 1859. A copy of this statement is forwarded herewith.

The society, however, appear to have extended the sphere of their operations beyond the limits originally contemplated, as in the list of their stations are Beyrout, Janina, Mount Lebanon, &c., and they make special reference to a report on the climate of Jerusalem in the memorial which they have handed in to the Board of Trade.

In the statement, Nos. I. and III. bear on general meteorology, with especial reference to Scotland.

In the different sections of No. II. the objects of the society are more precisely stated. Of these, sections Nos. 1, 2, and 4, relating to the application of meteorology to public health, agriculture, and horticulture, do not form a part of the operations of this office, as they were not contemplated by the Royal Society in their letter dated October 27, 1866. (W. 4,653.)

The meteorological data necessary for the prosecution of such inquiries in Scotland have been hitherto supplied by the tables published by the Registrar General for Scotland, from information derived from the Scottish Society's stations.

The Committee would venture to observe that the system of continuous self-recording registration introduced by them at their observatories must necessarily yield results of a much superior accuracy to those supplied by occasional eye observations, and that such a continuous method of observation forms the only safe basis on which such tables should rest.

I am instructed to enclose for your information specimens of the intended system of publication of the records from these self-recording observatories. The tables deduced from them for 1869 are in the press. Early copies of these will be at the service of the Registrar General for any of the three kingdoms. These accurate data, derived at present from a limited area, may be usefully supplemented by the occasional observations collected by the Scottish Meteorological and other kindred societies from several additional points of observation.

This Committee have as yet only established seven such observatories, but they keep steadily in view the desirability of extending their system, should the funds at their disposal allow of it, and have this year erected three additional self-recording instruments for the continuous registration of wind, both as to direction and force, at exposed points on the coasts of Great Britain.

The objects of the remaining sections, Nos. 3, 5, and 6, appear to be identical with those of this office. With reference to them the Committee have the pleasure to inform the Board of Trade that the Council of the Scottish Meteorological Society have consented, at their request, to supply the office with occasional weather observations from certain specified stations. It has been stated to the Council of the Scottish Society that this Committee will be responsible for all expenses entailed on the members and officers of the society by copying and transmitting information to London, so that no additional burden shall be thrown on the society's funds.

* Not printed here.

EXTRACT from the "Report of the Meteorological Society of Scotland" to the General Meeting held January 18th, 1859.

Objects of the Society.

I. The primary object will be to investigate Scottish meteorology, and for that purpose to ascertain the leading features of the climate of different districts into which Scotland may be divided.

II. Among subordinate objects the following may be enumerated:—

To point out the bearings of meteorology—

1. On public health, and on the appearance and spread of epidemics;
2. On agriculture and horticulture, and on the appearance and spread of diseases affecting crops and live stock;
3. To investigate the origin, movement, and (alleged periodical) recurrence of wind storms occurring in Scotland;
4. To point out the differences between the climate of Scotland and that of other countries, with a view to the introduction into Scotland of exotic plants suitable to its climate;
5. To ascertain the causes of the peculiar climate of Scotland during summer as well as winter;
6. To investigate the general laws regulating atmospheric changes, and the discovery of which may lead to a knowledge of the coming weather.

III. It will also be a primary object of the society, by the circulation and publication of reports, to disseminate meteorological information and encourage a taste for observation.

Read a letter, from Captain Toynbee submitting a register kept by Captain E. H. Capper, ship "Palm Tree," and recommending his name for a presentation copy of the Pilot Charts.

Mr. Scott was instructed to write to Captain Capper to thank him for his excellent log, and to present the Pilot Charts to him.

Instructions were requested by Mr. Scott with reference to the mode of dealing with deficiencies in the continuous records, when used for the preparation of mean results. He was instructed to intimate to Mr. Jeffery that for the present interpolation of the probable values would be allowed. All means obtained in this manner to be marked with a star.

Read a letter from Mr. Galton, who was unable to attend the meeting, with reference to a letter in the "Times" on the desirability of having reports of the sea disturbance forwarded several times a day from Dover. No action was taken.

Mr. Scott was instructed to notify to the several observatories the fact of Dr. Stewart's resignation of the secretaryship coming into effect on the 31st instant, so that all future communications on the business of the observatories, excepting with reference to the examination of their records and tabulations, should be addressed to him as director of the office.

Reported—That applications for telegraphic weather intelligence from Douglas, Briton Ferry, Newquay, and Pendennis having been approved by the Board of Trade, these stations had been added to the list of places warned.

Submitted — A form for the anemograms for the quarterly weather report. — Approved.

Resolved—That the sum of 1,500*l.* be withdrawn from the deposit account, London and Westminster Bank, and lodged to the current account of the Committee in the Bank of England.

The following cheques were drawn:—

For Salaries:	£	*s.*	*d.*
R. H. Scott	66	13	4
H. Toynbee	33	6	8
B. Stewart	33	6	8
W. Salmon	18	6	8
J. S. Harding, jun.	14	3	4
R. Strachan	*16	13	4
S. Jeffery (4 weeks to 26th)	12	0	0
F. Gaster	10	16	8
C. Harding	9	3	4
R. H. Curtis	7	10	0
F. Steventon	7	10	0

* Including allowance for care of instruments.

			£ s. d.
J. S. Harding, sen. (4 weeks to 26th)			7 14 0
C. E. Burton	„	„	7 0 0
E. Magrath	„	„	5 0 0
J. Curtis	„	„	5 0 0
W. G. James	„	„	5 0 0
G. G. Francis	„	„	3 0 0
F. Brodie	„	„	3 0 0
T. D. Bell	„	„	3 0 0
J. P. Cutts	„	„	3 0 0
For Instruments:			
P. Adie, repairs			4 19 6
Elliott, Brothers, aneroids, &c.			8 15 6
For Agencies at Ports:			
J. R. Jones, Aberdeen			10 18 3
H. J. Smart, Liverpool			11 0 5
For Telegraphy:			
A. Adie & Son, thermometer screens			3 15 0
Electric Telegraph Company, special charges, December		£29 4 3	
Electric Telegraph Company, message account, January		94 1 2	
Electric Telegraph Company, special charges, January		22 16 11	
			146 2 4
Submarine Telegraph Company, February			20 4 0
For Observatories:			
B. Stewart, Kew,			
Allowances for quarter		112 10 0	
Sundries, as per account		30 2 6	
			142 12 6
D. Thomson, Aberdeen,			
Allowance for quarter		62 10 0	
Less chemicals and waxed paper		21 17 3	
			40 12 9
T. R. Robinson, Armagh,			
Allowance for quarter		33 15 0	
Expenses, as per account		7 7 0	
			41 2 0
W. P. Dymond, Falmouth, Allowance for quarter			66 5 0
R. Grant, Glasgow, Allowance for quarter			62 10 0
S. J. Perry, Stonyhurst, Allowance for quarter			50 0 0
T. Kerr, Valencia,			
Salary for March			20 16 8
Expenses during quarter			42 2 4
H. Williams, Holyhead, Allowance and expenses			3 5 8
C. Clouston, Orkney, Allowance and expenses			3 15 0
G. T. Watson, Yarmouth			3 15 0
P. Adie, scales, &c.			4 14 9
L. P. Casella, hygrometer fittings at Kew			5 10 6
R. W. Munro, Armagh anemograph			70 0 0
For Special Printing:			
J. & C. Walker, outline maps			17 3 6

	£	s.	d.
For Contingencies:			
G. Bone, fire insurance	1	6	6
E. Higgs, packing cases	6	7	6
C. W. Jacques, rent of office	93	2	6
Newton & Son, repairing globe	2	10	6
G. Taylor, gas fittings	6	12	0
R. H. Scott, extra work of staff	48	3	3
Davey, Thompson, & Co., coals	2	6	0
For Office Petty Expenses:			
J. S. Harding, jun. (on account)	25	0	0
Total	£1,236	12	11

The Committee then adjourned.

116, *Victoria Street, April* 4, 1870.

PRESENT:

Capt. Richards in the Chair.

Mr. De La Rue. | Col. Smythe.
Dr. W. A. Miller. | Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting, March 28, were read and confirmed.

Reported—That the letter to the Board of Trade adopted at last meeting had been forwarded on the 29th ultimo.

Read the following:—

EXTRACT from Minute of Meeting of Council of the Scottish Meteorological Society, held at Edinburgh, 28th March 1870.

Mr. Scott's letter, dated Meteorological Office, London, March 22nd, 1870, having been read, the Council, before instructing Mr. Buchan to proceed with the filling in of the schedules which had been forwarded from the Meteorological Office, resolved, with the view of preventing any misunderstanding between the Meteorological Committee and the Council, to propose the following as the basis of agreement:—

I. That the Meteorological Committee forward the schedules to be filled up to the society's office, stating the date from which the extracts of observations are to be made.
II. That the extracts of observations be made, or verified, by the society's secretary under direction of the Council, and be then forwarded by him to London.
III. That in the event of the Meteorological Committee requiring any explanations they shall apply to the Council for such information.
IV. That no direct communication shall take place between the Meteorological Committee and the society's observers.

The Council resolved that this extract be sent to Mr. Scott, Meteorological Committee, London, with a request that he lay it before the Meteorological Committee.

(Signed) DAVID MILNE HOME,
Chairman.

Resolved—That this Committee are prepared to accept, as the basis of agreement, the first three proposals of the Council of the Scottish Meteorological Society as contained in the extract from their minutes of March 28th.

With reference to the fourth, they will, as requested, undertake to conduct all communications with the society's observers through the Council, with the exception of four gentlemen with whom the Meteorological Office is at present in connexion—

Professor R. Grant, Glasgow.
Rev. C. Clouston, Sandwick Manse.
Rev. A. Beverly, Aberdeen.
J. Bolam, Esq., Leith.

This agreement, however, is not to preclude the establishment of other stations in Scotland by the Meteorological Committee, independently of the Scottish Meteorological Society.

Mr. Scott was instructed to forward a copy of this resolution to the Council of the Scottish Meteorological Society.

The officers and clerks were re-appointed for the ensuing financial year at the following salaries. (See minutes 1867, p. 16; 1869, p. 38.)

	£	s.	d.
R. H. Scott, director of the office	800	0	0
Capt. H. Toynbee, marine superintendent	400	0	0
W. Salmon, chief clerk	*230	0	0
J. S. Harding, jun., 1st senior clerk	*180	0	0
R. Strachan 2nd do. (with 50*l.* additional for care of instruments)	*160	0	0
F. Gaster, senior clerk	*140	0	0
C. Harding, 1st junior clerk	*120	0	0
R. H. Curtis, 2nd do.	*100	0	0
F. Steventon, junior clerk	90	0	0

The following scale of weekly salaries was approved:—

S. Jeffery	3	0	0
J. S. Harding, sen.	1	18	6
C. E. Burton	1	15	0
†E. Magrath — increase 3*s.* per week	1	8	0
†J. A. Curtis — „ „ „	1	8	0
†W. G. James — „ „ „	1	8	0
†F. Brodie — „ „ „	0	18	0
†G. G. Francis — „ 2*s.* „	0	17	0
T. D. Bell — „ 1*s.* 6*d.* „	0	16	6
J. P. Cutts	0	15	0

The Rev. T. Kerr was re-appointed director of Valencia observatory at a salary of 250*l.* per annum.

Resolved—That a letter be written to the Secretary of the Treasury requesting an imprest of 2,000*l.* for the expenses of the office, until such time as the estimate should be passed.

Read a letter from Captain Toynbee submitting excellent logs kept by Captain Henry Henderson, barque "Hope," and Captain James Finlay, ship "Duncairn," and recommending the latter for a presentation copy of the Pilot Charts, Captain Henderson having already received them. (Minutes 1868, p. 60; 1869, p. 53.)

Resolved—That Mr. Scott be instructed to write to Captains Henderson and Finlay, thanking them for their very valuable observations, and to present a copy of the Pilot Charts to Captain Finlay.

The Committee then adjourned.

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* Increase in each of these cases 10*l.* since last year.

† In these cases the increase to date from the expiration of one year's service.

116, *Victoria Street, April* 11, 1870.

PRESENT:

Dr. W. A. Miller in the chair.

Mr. Gassiot. | Col. Smythe.

The Director was in attendance.

The minutes of last meeting, April 4, were read and confirmed.

Reported—That an application for an imprest of 2,000*l.* had been forwarded to the Treasury.

Reported—That a copy of the resolution adopted at the last meeting had been forwarded to Dr. A. Keith Johnston, Honorary Secretary of the Scottish Meteorological Society.

Read—A letter from Mr. Gray, enclosing a copy of the following letter sent by the Board of Trade to Mr. Lyon Playfair, M.P., in reply to the memorial of the Scottish Meteorological Society, dated 8th March 1870. (Minutes, 28th March, p. 32.)

M. 3,142.

Board of Trade,

SIR, Meteorology. April 5, 1870.

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 8th ultimo, enclosing, at the request of the Meteorological Society of Scotland, a memorial, praying the Board of Trade to move the Treasury to give them an annual grant.

In reply, I am to state that this Board have carefully considered the memorial and the statement enclosed in your letter, and that they are unable to find any grounds on which they can entertain and submit to the Treasury any proposition for a separate grant of public money to the Scottish Meteorological Society.

The Board of Trade will, however, be pleased to hear at any time that an arrangement has been effected between the Meteorological Committee of the Royal Society and the Scottish Meteorological Society, whereby the Scottish Society will co-operate in carrying forward the objects sought to be attained by the Meteorological Committee. If and when such an arrangement is made, the Board of Trade are satisfied that the Meteorological Committee will pay to the Scottish Society a proper sum in consideration of the services rendered.

I am, &c.

Dr. Lyon Playfair, M.P.

Mr. Scott reported that he had acknowledged the receipt of this communication.

Read—A letter from Mr. Farrer, enclosing the following questions addressed to the Board of Trade, and requesting the Committee to furnish replies:

Mr. Bass—To ask Mr. Lefevre whether the Board of Trade is responsible for the Meteorological Reports? Whether the Board think the stations reported are well selected? To ask where Skudesnaes and Oxö are situated? Whether they might not be advantageously exchanged for Dover, Brighton, or Bristol, and whether a report of the weather at Edinburgh, Birmingham, and Manchester would not be more interesting to the English public than from Paris, Lyons, and Strasbourg?

Mr. Scott was instructed to send the following reply:—

SIR, Meteorological Office, April 12.

IN reply to your letter of the 6th inst., containing Mr. Bass's question, I am instructed by the Committee to say that the stations from which reports are received have been selected with a view to our forming an opinion as to probable weather, with especial regard to storms.

Skudesnaes is on the coast of Norway, in lat. 59° N., and Oxö is an island near the Naze. Reports from the three Norwegian stations are required in order to supply information of the weather over the North Sea. The three inland French stations are useful in keeping this office informed of the weather prevailing over the adjacent parts of the continent.

The system of daily reports has been organized with reference to the needs of the shipping interest and the underwriters, and none of the foreign stations could be suppressed without materially impairing its efficiency for the purposes of weather signals.

The mere sea disturbance at the Straits of Dover is not of great importance as indicating probable weather, inasmuch as reports of this element are published daily from Yarmouth and C. Gris Nez.

However, I am to inform you that the Committee have resolved to reconstitute Dover (which has been discontinued since 1864) a reporting station. The addition of other stations on the same coast would, in their opinion, be scarcely worth their cost.

As to the inland stations in England mentioned by Mr. Bass, the reports for Leith and Liverpool represent the weather at Edinburgh and Manchester respectively, while intelligence from Bristol and Birmingham would hardly convey any information of use to shipping which is not already contained in the reports from Pembroke (St. Ann's Head), Holyhead, and other stations.

The published daily weather reports are drawn up with a view to their being intelligible and useful to seamen and shipowners, for whose benefit it has always been understood that this branch of our operations was in the first instance instituted.

Our choice of stations is seriously affected by the local conditions of the place, as from many parts of the coast it is almost impossible to obtain correct reports of wind.

I am, &c.
R. H. Scott.

To T. H. Farrer, Esq.,
Secretary, Board of Trade.

Resolved—That Dover be re-established as a reporting station.

Read—A letter from Capt. Toynbee, submitting an excellent register kept by Capt. J. Hayes, S.S. "Ptolemy," who has already received the pilot charts. (Minutes, 1869, p. 53.)

Mr. Scott was instructed to thank Capt. Hayes for his very valuable observations.

Submitted—An estimate for lithographing the charts of meteorological data for the Western Coast of South America for 45*l.* 2*s.*

Resolved—That these charts be referred to Capt. Richards for his opinion as to the advisability of publishing them.

Reported—That the Central Press Association (Limited) had applied for a copy of the daily weather report.

Supply sanctioned.

The following quarterly statement was submitted :—

Accounts Paid, and Liabilities, to 31st March 1870.

——	Paid.	Estimated Liabilities.
	£ *s.* *d.*	£ *s.* *d.*
Salaries - - -	3,205 14 5	—
Instruments, Mercantile Marine -	144 4 6	229 0 0
„ Admiralty - -	111 13 6	4 0 0
Agencies at Ports - -	82 7 11	—
Travelling - - -	120 9 1	—
Telegraphy - - -	2,193 16 7	272 0 0
Observatories, Current Expenses	2,236 13 0	97 0 0
„ Outfit - -	519 15 2	477 0 0
Special Printing - -	97 16 9	1 0 0
Contingencies - - -	1,706 0 8	—
Totals - -	£10,418 11 7	£1,080 0 0

Grand Total - - £11,498 11*s.* 7*d.*

Mr. Gassiot and Mr. Spottiswoode were requested to audit the accounts of the office for the past year.

The Committee then adjourned.

116, *Victoria Street, April* 25, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Dr. Miller.
Mr. Gassiot.	Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting, April 11, were read and confirmed.

Reported—The receipt of an imprest for 2,000*l.* from the Treasury.

Read—A letter from Mr. Farrer enclosing a request from Mr. Bass for daily telegraphic information of weather from the Midland Counties of England.

The consideration of this letter was postponed, Mr. Scott meanwhile was instructed to ascertain precisely what Mr. Bass requires.

Mr. Scott reported that M. C. Ste. Claire Deville had written to him requesting that information from Kew should be furnished to the Société Météorologique for publication in the Nouvelles Météorologiques, and that he (Mr. Scott) had informed M. Deville that it was impossible for this office to supply the information, but that if he applied to Mr. Stewart he might be able to obtain what was required, as the Committee had established the principle that each observatory might be permitted, after first obtaining their approval, to publish private deductions from the observations.

Read—The following letters :—.

General Post Office,
London, April 20, 1870.

SIR,

I BEG to forward, for your information, a translation of a letter which has been received from the Director-General of Telegraphs of the North German Confederation at Berlin, respecting the transmission of Meteorological Telegrams between Great Britain and North Germany, and *vice versâ*, and I request that you will favour me, for the information of the Postmaster-General, with the observations of the Meteorological Committee on this subject.

I must add, however, that it will not be possible for the department to transmit such messages gratuitously, unless the Submarine Telegraph Company agree to forego their share of the receipts accruing from such messages; but if the matter is of sufficient importance to the Meteorological Office the Submarine Telegraph Company shall be communicated with upon the subject.

I am, &c.

R. H. Scott, Esq., Meteorological Office. (Signed) FRANK IVES SCUDAMORE.

Berlin, March 27, 1870.

THIS General Post Office has for several years received daily telegraphical communications from various places in Germany, as well as foreign countries, respecting the Meteorological observations made in those places; they are brought together under one view and rendered available for scientific purposes, particularly the uses of Navigation.

It is the desire of this North German Administration to complete the summary of Meteorological observations by daily communications from England relating thereto, which would be especially interesting towards the attainment of the object in view.

As we have now received information from Professor Dr. Dove that, in several places in England, daily Meteorological observations are made under instructions from the Meteorological Office in London, the undersigned, on behalf of this general board, takes leave very respectfully to enquire of Her Majesty's General Post-Office, whether it would not be possible, under the guarantee of reciprocity, to forward daily Meteorological Reports by telegraph from the stations of observations at Kew, near London, as well as at Valencia and Falmouth; and in fine, whether Her Majesty's General Post-Office would be disposed to allow such transmissions to be conveyed gratuitously in accordance with the last clause (alinea) in the international convention.

Her Majesty's General Post-Office would much oblige the undersigned if it would be so good as to consult with the Meteorological Society in London on the subject in question.

In case a favourable reply should be made to this application, the undersigned ventures to request that the Board may at the same time be informed from what North German stations it is desired that Meteorological Despatches should be transmitted, it being of course understood that they would be forwarded gratuitously.

The General Board of Direction for the Telegraphs
of the North German Confederation.

Her Majesty's General Post-Office, London. (Signed) V. CHAUVINS.

Mr. Scott stated that he had written to Professor Dove and Herr von Freeden on the subject.

Consideration postponed.

Submitted—The following comparison between the velocity of the wind as registered by the anemometer at Great Yarmouth, and its estimated force by Beaufort scale as registered on board the "St. Nicholas Gat" light-vessel.

The comparisons are 604 in number, and extend from the 22nd September to the 31st December 1869. The observations are made daily, at 3 a.m., 9 a.m., noon, 3 p.m., 9 p.m., and midnight and in stormy weather additional observations are occasionally given by the lightkeeper, in order to account for his veering cable, &c., as requisite. The estimations seem extremely well made.

The following table represents the average velocity in miles per hour corresponding to the forces for which registrations have been obtained, without regard to the direction of wind at the time.

Force.	No. of Obs.	Av. Vel.	Force.	No. of Obs.	Av. Vel.
0 (calm)	3	1·7	6	90	23·7
1	21	4·1	7	61	28·2
2	27	8·2	8	20	32·8
3	77	10·4	9	6	28·8
4	162	13·6	10	6	33·0
5	132	16·8	11 and 12	None.	—

A mere glance at these values is sufficient to show that they not only appear low, but differ materially from those deduced by the Holyhead comparison (Minutes, p. 25). It was, moreover, observed in making the comparison that the velocity registered with any force when blowing from the eastwards always exceeded that recorded when with the same force the wind was westerly.

A new series of comparisons was therefore made, the registrations for each force being analysed according to the direction from which the wind blew at the time. The result, which is remarkable, is appended to this report; together with a diagram showing the variations which are found in forces 5 and 6. [See table A, p. 41, and diagram, p. 42.]

In the lower forces (0 to 3) the comparisons are too few in number to give *good* results and also in the higher (7 to 10); but from 4 to 6 there is a very serious discrepancy between the number of miles of wind passing the anemometer when its direction is easterly and those registered when it is westerly. In force 5 the velocity with easterly breezes is about double that with westerly, and this from averages of 132 observations in all, and the same kind of discrepancy is shown by all the other forces, though with hardly the same distinctness.

As the Anemograph is known to have good eastern exposure it would seem to be in some manner sheltered to the westward, so that when the wind is from this latter direction nearly one half of it fails to reach the cups. This supposition is confirmed by the fact that with easterly breezes the average velocities for forces 4, 5, 6, and 7 agree very closely with those corresponding to them, as found by the Holyhead comparison.

It was considered quite possible that the whole neighbourhood around Yarmouth might be sheltered in westerly winds by the large amount of land lying to the westward of it—*i.e.*, the whole breadth of England, and that in consequence the position of the instrument in that locality could not be improved; but a comparison between its indications and the estimations of a careful observer in the town and near the instrument gave results similar to those above mentioned, though from scarcity of observations the values were less regular. It therefore seems that the westerly current is locally interrupted in its passage to the instrument. The consequence is that 15m. per hour means a *fresh* westerly breeze (force 5), but 30m. per hour is the same strength of wind from the eastwards as shown by the anemograph—while 15m. is only a light wind of about force 3.

The number of comparisons in easterly winds are not sufficient to give very accurate results for the average velocity which correspond to all the forces 0 to 12.

Lastly, it should be stated that the office is indebted to the great kindness of the Elder Brethren of the Trinity House for the loan of the log of the lightship.

Mr. Scott reported that it seemed very desirable that the scale of Beckley's self-recording rain-gauge should be made to bear a definite proportion to that of the anemograms, and submitted an estimate from Mr. Hicks for altering the gauges now in process of construction, so as to comply with the above condition, for the sum of 3*l.* apiece, 21*l.* in all.

Approved—The relation of the scales to be as 1 : 4, so that the rain records can be reproduced on the anemogram plates by means of the pantagraph.

Read—A letter from Mr. Kerr requesting permission to purchase 200 gallons of paraffine oil.

Sanctioned.

Read—A letter from Rev. Dr. Robinson, suggesting that no annual publication of numerical wind results should be made, inasmuch as five years would be the shortest period which would be at all likely to yield satisfactory results.

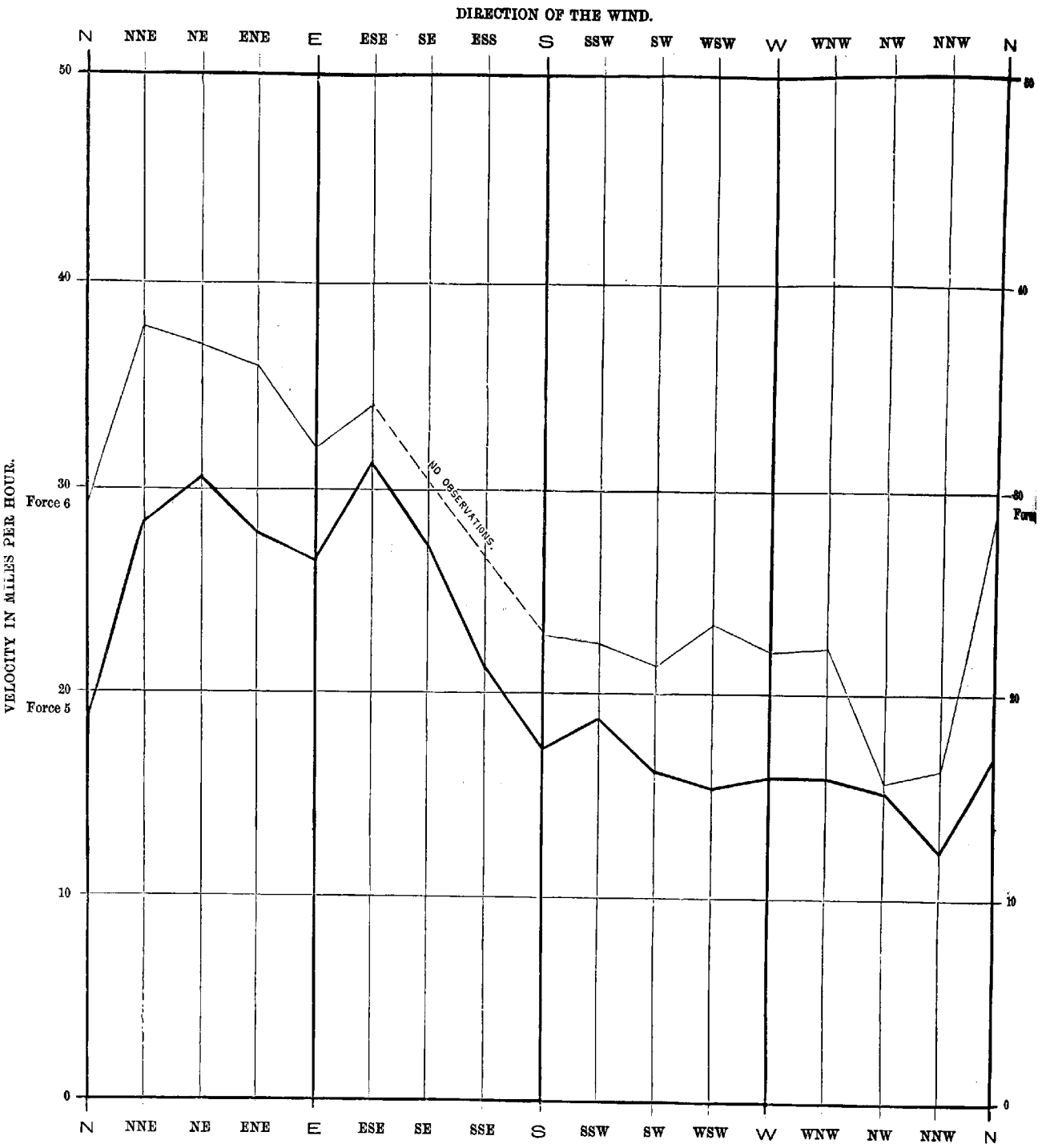
Approved—No annual publication to be made.

A.

Average Velocity of Wind in Miles per Hour, corresponding to each force in the Beaufort Scale, the direction being referred to 16 points.

	Average Velocity of Wind and number of comparisons. (Beaufort Scale Forces.)																						Direction of the Wind.
	0 (Calm.)		1		2		3		4		5		6		7		8		9		10		11 and 12		
	No. of Obs.	Av. Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	Obs.	Vel.	
North	–	–	–	–	–	–	2	11.5	1	14·0	3	18·3	2	29·0	3	37·7	2	37·0	1	30·0	–	–	No Observations recorded in the time.		North.
N.N.E.	2	2·0	5	3·0	1	8·0	–	–	–	–	2	28·0	6	37·8	4	40·8	2	47·5	–	–	–	–			N.N.E.
N.E.	–	–	–	–	1	6·0	–	–	–	–	2	30·5	1	37·0	2	43·0	–	–	–	–	–	–			N.E.
E.N.E.	–	–	–	–	2	8·0	7	13·7	6	22·2	3	28·0	1	36·0	–	–	–	–	–	–	–	–			E.N.E.
East	–	–	3	5·7	–	–	3	11·3	5	21·2	12	26·8	1	32·0	–	–	–	–	–	–	–	–			East.
E.S.E.	–	–	–	–	–	–	–	–	2	15·5	1	31·0	1	34·0	1	38·0	–	–	–	–	–	–			E.S.E.
S.E.	–	–	1	6·0	5	6·8	4	10·0	5	22·6	4	27·3	–	–	–	–	–	–	–	–	–	–			S.E.
S.S.E.	–	–	1	6·0	3	11·0	3	11·7	16	17·8	8	21·1	–	–	–	–	–	–	–	–	–	–			S.S.E.
South	–	–	2	3·5	–	–	10	9·4	5	14·8	8	17·1	6	22·8	9	30·7	2	31·0	–	–	–	–			South.
S.S.W.	–	–	–	–	2	8·5	11	10·2	16	12·3	8	18·5	13	22·2	3	26·0	–	–	–	–	–	–			S.S.W.
S.W.	–	–	2	1·5	3	8·3	5	9·4	19	11·0	19	15·9	4	21·3	1	20·0	1	30·0	1	37·0	–	–			S.W.
W.S.W.	–	–	–	–	4	7·8	7	9·4	33	12·2	26	15·4	17	23·1	9	28·1	3	32·0	–	–	–	–			W.S.W.
West	–	–	3	6·0	2	8·5	7	10·1	24	13·1	14	15·7	10	21·8	9	28·0	2	35·0	–	–	1	46·0			West.
W.N.W	–	–	2	5·0	1	9·0	9	9·1	14	12·2	13	15·8	19	22·0	13	28·2	4	33·0	–	–	–	–			W.N.W.
N.W.	–	–	1	3·0	1	8·0	6	13·8	10	10·3	4	15·0	4	15·3	4	26·5	1	21·0	1	28·0	–	–			N.W.
N.N.W.	1	1·0	1	1·0	2	9 5	3	7·0	6	10·6	5	12·3	5	16·2	3	24·0	3	25·3	3	26·0	5	30·4			N.N.W.
North (repeated)	–	–	–	–	–	–	2	11·5	1	14·0	3	18·3	2	29·0	3	37·7	2	37·0	1	30·0	–	–			N.(repeated)

N.B. The values for North are repeated at the bottom of this table merely for the sake of more easy comparison with those for N.N.W


DIRECTION OF THE WIND.
N NNE NE ENE E ESE SE ESS S SSW SW WSW W WNW NW NNW N
VELOCITY IN MILES PER HOUR.
50
40
30
Force 6
20
Force 5
10
0
NO OBSERVATIONS.
N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW N

Submitted—The following report regarding the records for March 1870, received from the self-recording instruments of the various observatories, which have been examined at Kew in accordance with the regulation adopted by the Meteorological Committee (see Minutes, December 21, 1868).

Anemograph.

Aberdeen.—The anemograph at this station has been in good action during the month. Seven hourly values of velocity and six of direction were lost on March 21st, on account of alterations being made to the shaft in accordance with instructions sent, otherwise the records are complete.

The orientation was tested on March 21st and found correct.

No error has been detected at Kew by examination.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference - - -	1·0 - -	2·0
(2.) Mean difference irrespective of sign -	0·3 - -	0·9
(3.) Residual difference (Aberdeen—Kew) -	0·0 - -	+0·2

Armagh.—The anemograph at this station has been in good action during the month, and the records are quite complete.

No error has been detected at Kew.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	1·0
(2.) Mean difference irrespective of sign	0·2	0·2
(3.) Residual difference (Armagh—Kew)	+0·1	0·0

Falmouth.—The anemograph at this station has been in good action during the month and the records are complete.

No error has been detected at Kew.

The orientation was tested on the 18th March and found correct.

Forty remeasurements have been made both of direction and velocity at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference (Falmouth—Kew)	0·0	−1·0

Glasgow.—The instrument at this observatory has been in good action excepting the velocity trace which presents a serrated appearance more marked in light winds. The hourly record for both velocity and direction for 11 a.m. of the 26th March, was lost on account of the instrument being examined. The records are otherwise complete.

The orientation was tested on March 10th and found correct.

The following errors have been detected at Kew, and set right.

In velocity—

March 11, 11 a.m., 19 should be 29
„ 21, 10 p.m., 17 „ 27

Forty remeasurements have been made at Kew both for direction and velocity with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·5
(3.) Residual difference (Glasgow—Kew)	+0·1	+0·2

Kew.—The anemograph at this observatory has been in good action and the records are complete, excepting one hourly value of the velocity which was lost on the 29th on account of the cups being painted.

The orientation was tested on March 30th and found correct.

The following error has been detected on examination and set right:

In velocity—

March 16, 10 p.m., 16 should be 7.

Forty remeasurements of both direction and velocity have been made at Kew with the following results:

	Direction.	Velocity
(1.) Greatest difference	1·0	1·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference (Kew^1—Kew^2)	0·0	0·0

Stonyhurst.—The anemograph at this station has been in good action. One hourly value of velocity was lost on March 11th through the instrument not being started, also 11 hourly values were lost on the 21st, on account of part of the brass fittings being sent to Preston for alteration, and the velocity trace from 11 a.m. on 22nd to 11 a.m. on 23rd was lost, the pencil failing to mark on the paper.

The following error has been detected at Kew and corrected.

In direction—

March 4, noon, 9 should be 7
„ 16, 7 a.m., 16 „ 18

This error was detected at Stonyhurst.

Forty remeasurements have been made both for direction and velocity at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·3	0·6
(3.) Residual difference (Stonyhurst—Kew)	0·0	+0·1

Valencia.—The anemograph at this station has been in good action during the month of March, and the records are complete.

The following errors have been discovered at Kew and put right.

In velocity—

March 1, 3 a.m., 32 should be 25
„ 4, 7 p.m., 17 „ 11
„ 5, 4 p.m., 6 „ 16
„ 6, 2 a.m., 8 „ 18

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·9
(3.) Residual difference (Valencia—Kew)	0·0	−0·1

Barograph.

Aberdeen.—The action of the barograph at this station has been good during the month of March. The photography has been good. The records are complete, with the exception of one hourly value lost at 11 a.m. March 29, on account of the instrument not being started.

No error has been detected at Kew on examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0040
(2.) Mean difference irrespective of sign	0·0015
(3.) Residual difference (Aberdeen—Kew)	−0·0005

The mean monthly difference between simultaneous barograph and standard readings is 0·0018.

Armagh.—The Armagh barograph has been in good action, and the photography has been good—The records are quite complete. The bagging is much improved, but there is an anomalous fall towards the centre in the temperature curves of No. 63, 64, and No. 81, 82.

The following errors have been discovered at Kew and corrected.

In applying the residual correction—

March 11, 1 p.m., 29·744 should be 29·754
„ 22, 1 a.m., 29·969 „ 29·769

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0022
(3.) Residual difference (Armagh—Kew)	+0·0009

The mean monthly difference between simultaneous barograph and standard readings is 0·0026.

Falmouth.—The action of the barograph at this station has been good during the month of March, and the photography has been very good.

The hourly values for 5 p.m. of March 18, and for 11 a.m. on 25th, have been lost on account of failure of gas, the records are otherwise complete.

No error has been detected at Kew by examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0040
(2.) Mean difference irrespective of sign	0·0016
(3.) Residual difference (Falmouth—Kew)	+0·0003

The mean monthly difference between simultaneous barograph and standard readings is 0·0024.

Glasgow.—The barograph at this observatory has been in good action, and the photography good for the month of March. The records are quite complete.

No error has been detected at Kew by examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0022
(3.) Residual difference (Glasgow—Kew)	+0·0003

The mean monthly difference between simultaneous barograph and standard readings is 0·0017.

Kew.—The action of the barograph at this observatory has been good during the month, and the photography has been good excepting No. 63-64.

The hourly tabulations for 7 and 8 a.m. of March 1st have been lost on account of the gas being low. The records are otherwise complete.

No error has been detected by examination.

Forty remeasurements have been made with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0018
(3.) Residual difference (Kew^1—Kew^2)	−0·0006

The mean monthly difference between simultaneous barograph and standard readings is 0·0022.

Stonyhurst.—The barograph has been in good action during the month of March, Curve 61-62 is so faint as to be illegible, while curve 81-82 has had to be traced over at Kew, the measurements being made with ivory scale; on account of this failure forty-two hourly values have been lost. The records are otherwise complete.

No error has been discovered at Kew by examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0016
(3.) Residual difference (Stonyhurst—Kew)	+0·0001

The mean monthly difference between simultaneous barograph and standard readings is 0·0020.

Valencia.—The barograph at this station has been in good action during the month, and the photography has been good.

The records are quite complete.

The following errors have been detected at Kew and set right:

In calculating residual correction—

March 12–13, −·011 should be −·009

In applying residual correction—

March 3,	7 p.m.,	29·510 should be	29·610
„	8 p.m.,	29·648 „	29·638
„ 11,	7 a.m.,	30·116 „	30·126
„ 14,	9 p.m.,	29·623 „	29·643
„ 16,	3 a.m.,	29·365 „	29·375
„	mid.,	29·701 „	29·711
„ 15,	6 p.m.,	29·319 „	29·309
„ 20,	3 p.m.,	30·421 „	30·431

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference - - - -	0·0060
(2.) Mean difference irrespective of sign - -	0·0020
(3.) Residual difference (Valencia—Kew) - -	+0·0011

The mean monthly difference between simultaneous barograph and standard readings is 0·0020.

THERMOGRAPH.

Aberdeen.—The Aberdeen thermograph has been in good action during March, and the photography has been good. The cylinder was under repair between 11 a.m. and 5 p.m. on the 29th inst., on account of which four hourly values have been lost for both instruments. The dry bulb records are otherwise complete. Twenty-two readings of the wet bulb have been rejected, and one rendered doubtful, on account of frost.

The records are otherwise complete.

The following error was detected and put right:

In entering the wet bulb standard March 9th, 10 p.m., 39·5 should be 38·9

Forty remeasurements have been made at Kew with the following results, viz.:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·2
(2.) Mean difference irrespective of sign - -	0·07	0·07
(3.) Residual difference (Aberdeen—Kew) - -	—0·00	—0·03

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·14	0·14

Armagh.—The thermograph has been in good action during the month, and the photography is very good. The records of the dry bulb are quite complete. Sixteen hourly tabulations of the wet bulb have been lost and 15 rendered doubtful on account of frost. The records are otherwise complete.

The following errors have been detected and put right:

In tabulation—

March	2,	1 a.m.,	dry bulb,	38·3	should be	37·3
„	3,	2 a.m.,	„	37·3	„	36·3
„	5,	5 a.m.,	„	34·0	„	33·1
„	„	6 a.m.,	„	33·0	„	32·5
„	„	7 a.m.,	„	32·5	„	33·7
„	„	1 p.m.,	wet bulb,	37·5	„	37·0
„	10,	5 a.m.,	„	36·0	„	36·4
„	11,	9 a.m.,	„	41·6	„	41·0
„	23,	8 p.m.,	dry bulb,	36·3	„	37·2
„	„	9 p.m.,	„	35·7	„	36·6
„	25,	9 a.m.,	„	37·2	„	37·9
„	22,	11 a.m.,	wet bulb,	33·2	„	32·5
„	25,	4 a.m.,	„	31·6	„	32·3
„	26,	11 a.m.,	„	35·5	„	36·4
„	27,	3 a.m.,	„	30·5	„	29·4

In maxima and minima—

Minimum on March 13th was 30·6 at 11.20 p.m., should be 25·2 at 5.30 a.m.
Maximum on March 16th was 51·6 at 10·45 a.m., should be 52·0 at 3 p.m.

Also the wet bulb curve from 8 p.m. on 22nd, till 10 a.m. on 23rd, has been retabulated, the first measurements having been made from a wrong setting of the scale.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·11	0·16
(3.) Residual difference (Armagh—Kew) - -	0·0	+0·04

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·18	0·17

Falmouth.—The thermograph has been in good action during the month; and the photography is good. In the dry bulb the hourly reading for 11 a.m. on the 25th has been lost on account of the gas being turned off, the dry bulb records are otherwise complete. The same reading was lost in the wet bulb, besides which the gas failed at 6 p.m. of the 18th, but the hourly reading was preserved by means of the standard reading; the wet bulb records are otherwise complete.

No error has been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·2
(2.) Mean difference irrespective of sign	0·08	0·07
(3.) Residual difference (Falmouth—Kew)	— 0·05	0·0

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·09	0·09

Glasgow.—The thermograph has been in good action during the month, and the photography is also good.

The gas went out on 11th at 11 a.m., on account of which one hourly record of the dry bulb has been lost. The dry bulb records are otherwise complete.

Thirty-seven readings of the wet bulb have been rejected on account of frost. The records are otherwise complete.

The following errors have been detected at Kew.

In tabulation—

March 6, 1 p.m., wet bulb, 33·8 should be 35·0
„ 27, 3 a.m., „ 39·6 „ 29·6

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·08	0·09
(3.) Residual difference (Glasgow—Kew)	— 0·02	— 0·08

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·09	0·12

Kew.—The thermograph has been in good action during the month, and the photography is good. The dry bulb records are quite complete. Forty-six readings of the wet bulb have been rejected and two rendered doubtful on account of frost; the records are otherwise complete.

No errors have been detected.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·2	0·2
(2.) Mean difference irrespective of sign	0·07	0·07
(3.) Residual difference (Kew^1—Kew^2)	— 0·06	— 0·02

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·08	0·10

Stonyhurst.—The thermograph has been in good action during the month, and the photography is good. The dry bulb records are quite complete. Of the wet bulb, 20 readings have been rejected and 16 rendered doubtful on account of frost. The records are otherwise complete.

The following errors have been detected and put right:

In tabulation—

March 4th, 3 p.m., dry bulb 35·1 should be 36·0.

Also the wet bulb curve from 1 a.m. on 12th, till 10 a.m. on 13th, has been retabulated at Kew, the first measurements having been made from an incorrect setting of the glass scale.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·11	0·10
(3.) Residual difference (Stonyhurst—Kew)	— 0·07	— 0·03

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·11	0·11

Valencia.—The thermograph has been in good action during the month, the photography is also good. The records for both bulbs are quite complete.

The following errors have been detected and put right:

In entry of standard readings—

March 8, 2 p.m., 40·7 should be 44·7.

In maxima and minima—

March 20, minimum read 45·8 at 1.0 a.m., should be 44·6 at 0h. 5m. a.m.
„ 23, maximum 41·6 should be 44·6

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·15	0·14
(3.) Residual difference (Valencia—Kew)	+0·04	— 0·01

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·15	0·20

In the following Table the number of hourly records lost during the month of March is exhibited:

	Anemograph.		Barograph.	Thermograph.				
	Direction.	Velocity.		Dry Bulb.	Wet Bulb.			
					Out of action.	Frost.		Other causes.
						Lost.	Rendered doubtful.	
Aberdeen -	6	7	1	4	0	22	1	4
Armagh -	0	0	0	0	0	16	15	0
Falmouth -	0	0	2	1	0	0	0	1
Glasgow -	1	1	0	1	0	37	0	0
Kew - -	0	1	2	0	0	46	2	0
Stonyhurst -	0	36	42	0	0	20	16	0
Valencia -	0	0	0	0	0	0	0	0

The following cheques were drawn:—

		£	s.	d.
For Office Salaries and Wages—				
R. H. Scott - - - - - - -		66	13	4
J. S. Harding, jun. - - - - - -		15	0	0
J. S. Harding, sen., 5 weeks to 30th - - - -		9	12	6
T. D. Bell „ - - - -		4	2	6
For Observatories: salaries and computations—				
S. Jeffery „	5 weeks to 30th -	15	0	0
C. E. Burton „	„ -	8	15	0
E. Magrath „	„ -	7	12	0
J. P. Cutts „	„ -	3	15	0
T. Kerr, Valencia, April - - - - -		20	16	8
For Telegraphy: salaries and computations—				
F. Gaster „	- - -	11	13	4
F. C. Steventon „	- - -	7	10	0
F. Brodie „	5 weeks to 30th -	4	7	0
G. G. Francis „	„ -	4	5	0
R. Carne, signal staff, New Quay - - - - -		4	12	0
For Ocean Meteorology: salaries and computations—				
Captain H. Toynbee „	- -	33	6	8
W. Salmon „	- -	19	3	4
R. Strachan „	- -	*17	10	0
C. Harding „	- -	10	0	0
R. H. Curtis „	- -	8	6	8
J. A. Curtis „	5 weeks to 30th -	6	5	0
W. G. James „	„ -	6	5	0
For Office Expenses—				
J. S. Harding, jun., on account - - - - -		70	0	0
	Total - -	354	11	0

The Committee then adjourned.

* Including allowance for care of Instruments.

116, *Victoria Street, May* 2, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Dr. W. A. Miller.
Mr. Galton.	Capt. Richards.
Mr. Gassiot.	Colonel Smythe.

Mr. Spottiswoode.

The Director was in attendance.

Mr. Scott reported that he had received an answer from Herr von Freeden, of Hamburg, to his letter noticed in last Minutes, but that no reply had as yet arrived from Professor Dove. He was instructed to inform Mr. Scudamore that the Committee's reply to his letter of the 20th April must be deferred till more information is obtained regarding the cost to this office.

Read—The following letter:—

General Post Office,
London, April 27, 1870.

SIR,

I REQUEST to be informed whether you have any objection to your meteorological messages being sent from Telegraph Street to the Foreign Office on the private wire belonging to that office, instead of to the Telegraph Office in Parliament Street.

The reason of this proposed alteration in the circulation of your messages is twofold, viz., to enable you to receive your messages more speedily and to avoid the delay of public telegrams which now takes place on the Parliament Street circuit in consequence of your messages being transmitted on that wire.

I am, &c.

R. H. Scott, Esq., Meteorological Office. (Signed) FRANK IVES SCUDAMORE.

Mr. Scott reported that he had at once informed Mr. Scudamore that this office would gladly consent to any arrangement proposed by the Post Office with a view of facilitating the transmission of its messsages.

Approved.

Read—Memoranda, with excerpt from Minutes of the meeting of Council of the Scottish Meteorological Society, April 26, 1870. Receipt acknowledged April 28th.

Reported—That the Board of Trade had applied for information respecting the weather at Yarmouth between the 10th and 14th of February last, and that copies of the anemometrical returns had been supplied.

Approved.

Reported—That Mr. Charles Burton had been suffering from threatened abscess in the leg, and that he had been ordered to leave London for a time to complete his recovery. Mr. Scott stated that he had given him leave of absence for one month from the 16th of April.

Sanctioned.

Read a letter from Capt. Toynbee, submitting "excellent" logs kept respectively by Capt. Michael Murphy, S.S. "Tarifa," and Mr. G. A. B. Scott, chief officer, S.S. "Nestorian," and recommending these gentlemen for presentation copies of the Atlantic Pilot Charts.

Mr. Scott was instructed to thank Capt. Murphy and Mr. Scott for their registers, and to forward a copy of the Pilot Charts to each gentleman.

The Committee then adjourned.

116, *Victoria Street, May* 9, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Dr. W. A. Miller.
Mr. Gassiot. | Mr. Spottiswoode.

The Director was in attendance.

The Minutes of the last two meetings, April 25 and May 2, were read and confirmed.

The Auditors presented the following Report, which was received and ordered to be entered on the Minutes.

METEOROLOGICAL OFFICE REVENUE AND EXPENDITURE ACCOUNT for the year ended 31st March 1870.

Dr. REVENUE.

	£	s.	d.
To Parliamentary vote - -	10,000	0	0
Balance from year 1868–69 -	1,743	11	3
Earl of Stair - - -	4	5	0
Proprietors and fishermen of Downies	4	5	0
H. Lee and Sons - - -	2	10	0
W. W. Rundell - - -	12	12	6
G. Dornbusch - - -	10	0	0
J. Balbirnie - - -	4	5	0
Hill and Price - - -	5	10	0
Rev. C. H. Griffith - -	2	10	0
Telegraph Maintenance, &c. Co. -	3	0	4
Rev. J. T. Waller - -	0	10	8
Cork Harbour Commissioners -	4	11	0
Capt. J. Wessendorff - -	4	5	0
J. G. Gamble - - -	2	10	0
Sale of old instruments - -	29	6	9
Do. signal staff - -	1	9	9
Interest on deposit account -	70	3	5
	£11,905	5	8

EXPENDITURE. *Cr.*

Office.

	£	s.	d.	£	s.	d.
By Salary of Director -	800	0	0			
Do. Secretary to Committee - -	400	0	0			
Do. 2 clerks -	209	7	6			
Office keeper and messenger - -	152	13	9			
				1,562	1	3
Rent of office -	376	17	0			
Furniture and fittings	751	15	9			
Postage - -	90	19	7			
Printing, &c. - -	44	17	3			
Travelling expenses -	9	11	11			
Fuel and gas - -	19	19	11			
Attendance, cleaning and other contingencies - -	110	2	2			
				1,404	3	7

Land Meteorology.

Expenses at observatories -	2,277	3	9			
New instruments for do. - -	519	15	2			
Computations -	377	6	3			
				3,174	5	2
Telegrams -	2,193	16	7			
Inspections and other expenses - -	87	9	11			
Computations -	357	13	7			
				2,639	0	1

Ocean Meteorology.

Marine superintendent	400	0	0			
Supply and return of instruments:						
Admiralty -	111	13	6			
Mercantile marine	262	8	5			
Computations and care of instruments -	864	19	7			
				1,639	1	6
				10,418	11	7
Cash in hand -	35	12	7			
Advance to Valencia Observatory -	50	0	0			
Bank of England account - -	285	5	1			
London and Westminster Bank -	1,115	16	5			
				1,486	14	1
				£11,905	5	8

Examined and compared with the vouchers and found correct.

J. P. GASSIOT
W. SPOTTISWOODE } Auditors.

4th May 1870.

STATEMENT showing BALANCE on April 1, 1870, and an estimated amount of LIABILITIES payable from the same.

	£	s.	d.	£	s.	d.
Balance on 1st April				1,486	0	0
Instruments:—						
Admiralty	4	0	0			
Mercantile Marine	229	0	0			
Telegraphy	272	0	0			
Observatories:—Current expenses	106	0	0			
Do., New instruments, &c.:—	£	s.	d.			
Rain gauges	210	0	0			
Pantagraphs	278	0	0			
Other instruments	15	0	0			
Yarmouth anemometer	31	0	0			
	534	0	0			
Printing	1	0	0			
				1,146	0	0
Leaving a probable surplus of				£340	0	0

Read—A letter from Capt. Toynbee, submitting an excellent register kept by Capt. P. Petrie, S.S. "Patagonia," a gentleman who has already received the Pilot Charts (Minutes, p. 6).

Mr. Scott was instructed to thank Capt. Petrie for his valuable observations.

Submitted—Proofs of the Introduction to and text of the Quarterly Weather Report, which were provisionally approved.

The Committee then adjourned.

116, *Victoria Street, May* 16, 1870.

PRESENT:

F. Galton, Esq., in the Chair.

Mr. De La Rue. | Dr. W. A. Miller.
Mr. Gassiot. | Sir E. Sabine.

Colonel Smythe.

The Director was in attendance.

The Minutes of last meeting, May 9th, were read and confirmed.

Submitted—The following correspondence:—

EXCERPT from MINUTES of a MEETING of the COUNCIL of the SCOTTISH METEOROLOGICAL SOCIETY, held on 26th April 1870, referred to in subsequent correspondence (Minutes, Meteorological Committee, p. 48.)

Present: D. Milne Home, President of the Council, in the chair; Admiral Sir W. Hope Johnstone; Admiral Sir W. Ramsay; Professor Balfour; Dr. Keith Johnston; Dr. Robertson; Messrs. James Cunningham, H. Stephens, T. Stevenson, R. M. Smith, R. Tennent.

The meeting having had laid before them the resolution of the Meteorological Committee of date 4th April, resolved to agree to the same, except with reference to the last paragraph referring to the establishment of new stations in Scotland, with regard to which the Council beg to express a hope that the Committee would do them the favour to communicate with them before establishing such stations.

The meeting had at the same time before them the answer by the Board of Trade to the memorial of the Council asking for a separate grant of public money, in which answer their Lordships state that whilst unable to move the Treasury to give a special grant, their Lordships would be pleased to learn that an arrangement had been effected between the Meteorological Committee and the Scottish Society, whereby the latter will co-operate in carrying forward the objects sought to be attained by the Committee.

The Council resolved to agree to this proposal, and in accordance therewith to intimate their desire to co-operate with the Committee, leaving to the Board of Trade to fix the amount of the sum to be paid in consideration of the services rendered.

In any such arrangement it will of course be understood that the independence of the Society in the management of its affairs shall be in nowise affected.

The Council further resolved that a copy of these Minutes shall be communicated to the Meteorological Committee, and also to the Board of Trade.

(Signed) A. KEITH JOHNSTON, Hon. Sec.

DEAR SIR, Edinburgh, 9th May 1870.

ON the 27th ultimo I transmitted to you extract from Minutes of Council of the Meteorological Society, asking your Committee to suggest terms of an arrangement between you and us.

Some of our friends in Parliament have written to say that, in the view of the impending discussions in the House of Commons on the subject of the annual grant of 10,000*l.*, they are very anxious to learn whether a satisfactory agreement has been effected between your Committee and us.

They say that such an agreement, if it could be referred to in the course of the discussion, would strengthen their hands in upholding the grant against sundry enemies to its continuance.

We shall be glad to receive an immediate reply from your Committee.

I remain, &c.

(Signed) A. KEITH JOHNSTON, Hon. Sec.

Robert H. Scott, Esq.

DEAR SIR, Meteorological Office, May 10th 1870.

THE excerpt from your Minutes was laid before the Committee, but they did not instruct me to send any further reply.

It does not contain any request that this Committee should "suggest terms of an arrangement." It simply asks us to let you know when we are about establishing new stations in Scotland, which we shall of course do.

The co-operation which we *have* asked for is as regards the observations of wind and weather, out of my application for which, in January last, the correspondence has arisen.

The Committee do not meet till Monday next. Could you kindly let me know whether there could have been any mistake in copying the words of the excerpt sent to me?

It most certainly contains no request of the nature indicated in your letter.

Yours very truly,

(Signed) ROBERT H. SCOTT.

A. Keith Johnston, Esq., LL.D.

DEAR SIR, Edinburgh, 13th May 1870.

I REGRET that you did not clearly understand the meaning of the communication I sent you from our Council meeting of the 26th ult. It may not have been very explicitly stated in my letter, as the papers were not at hand at the time. But our meaning was simply to ask if your Committee are prepared to recommend to the Board of Trade that we should have the grant of such a sum of money as will enable us to engage a clerk and other assistants, in order that we may co-operate with you in the manner indicated by the Board. It will therefore be a favour if you will bring the matter before your Committee at your meeting on Monday next, and communicate to me the result of their deliberations by that day's post, in order to guide our Society in their future proceedings.

I remain, &c.

R. H. Scott, Esq., (Signed) A. KEITH JOHNSTON,
Director, Meteorological Office. Hon. Sec.

Mr. Scott was instructed to reply as follows:—

SIR, Meteorological Office, 16th May 1870.

IN reply to your note of the 13th instant, I am directed to acquaint you that the Meteorological Committee are not prepared to recommend to the Board of Trade that your Society should receive a grant of money to enable them to engage a clerk and other assistance.

The co-operation the Meteorological Committee proposed is explained in my letter of January 19th, and in the memorandum (No. 17) already forwarded, and of which I now enclose another copy.

You will observe by the first paragraph, second page, that the form is to be filled up only "whenever "a storm or very sudden change of weather is noticed, and also occasionally when specially requested "by letter."

The expense incurred, from time to time, in obtaining and forwarding this information the Meteorological Committee are prepared to defray.

I have the honour, &c.

(Signed) ROBERT H. SCOTT,
A. Keith Johnston, Esq., LL.D. Director.

Mr. Scott was instructed to forward a complete copy of the correspondence between the Committee and the Council of the Scottish Meteorological Society to the Board of Trade.

Read—A letter from Captain Toynbee accompanying an excellent register from Captain Watson, who has already received the Pilot Charts, and the special thanks of the Committee (Minutes, 1869, pp. 61, 113).

Mr. Scott was instructed to express to Captain Watson the sincere thanks of the Committee for this fresh proof of his zeal in meteorology.

Submitted—The following report regarding the records for April 1870, received from the self-recording instruments of the various observatories, which have been examined at Kew in accordance with the regulations adopted by the Meteorological Committee (see Minutes, December 21st, 1868).

ANEMOGRAPH.

Aberdeen.—The anemograph at this station has been in good action during the month of April. One hourly value of velocity and one of direction was lost on the 23rd, noon, in consequence of the exterior of the instrument being painted. Also one hourly value, both for direction and velocity, lost on April 25, at noon, from repetition of the above; otherwise the records are complete. The orientation was tested on April 16, and found correct.

The following error has been detected at Kew and corrected:

In direction, discovered by remeasurements:

April 12th, 2 p.m., 19 should be 17.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·3	0·7
(3.) Residual difference (Aberdeen—Kew)	+0·1	0·0

Armagh.—The anemograph at this station has been in good action, and the records for the month are complete.

No errors have been found on examination.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	1·0
(2.) Mean difference irrespective of sign	0·3	0·2
(3.) Residual difference (Armagh—Kew)	+0·2	0·0

Falmouth.—The Falmouth anemograph has been in good action during April, and with one exception the records are complete. This occurred on the 25th, when the velocity shaft was removed for alteration of its bearing, and three hourly values were in consequence lost.

The cylinder remained unclamped for one hour on the 21st, but there was no failure of the trace.

The orientation was proved to be correct on the 21st.

No error has been detected at Kew.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·5
(3.) Residual difference (Falmouth—Kew)	0·0	0·0

Glasgow.—The anemograph at this observatory has been in good action during the month, but the working of the pencils continues to be somewhat unsatisfactory. The instrument has been examined and cleaned during the month, but the fault has not been wholly removed. Blanks occur in the records in the following places:—On the 8th, for seven hours, both of direction and velocity; 11th, one hour of each; on the 19th, one hour of velocity; and on the 20th, three of velocity and one of direction, all occurring at times when the instrument was undergoing examination or alteration.

No error has been discovered at Kew.

Forty remeasurements of direction and velocity have been made with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·4	0·6
(3.) Residual difference (Glasgow—Kew)	+0·2	+0·1

Kew.—At this observatory the anemograph has been in good action. The records are complete, and no errors have appeared on examination.

Forty remeasurements of direction and velocity have been made with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	1·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference ($Kew^1 - Kew^2$)	+0·1	−0·1

Stonyhurst.—The Stonyhurst anemograph has been in good action during the month; there have been no failures in the records, nor has any error been detected at Kew.

The orientation was tested on the 18th and found correct.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·7
(3.) Residual difference (Stonyhurst—Kew)	0·0	−0·2

Valencia.—The action of the anemograph at this station has been good, but occasional defects still appear in the direction trace with light winds.

The records are complete.

The following error was detected at Kew and corrected:

In velocity—

April 21, 11 a.m., 38 should be 48.

The orientation was tested on the 16th and found correct.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·9
(3.) Residual difference	0·0	0·0

Barograph.

Aberdeen.—The action of the barograph at this station has been good during the month, and the photography has been good. There was, however, a failure of gas on April 17, 1 p.m., to 18 noon; in consequence of this 20 hourly values are lost. The records are otherwise complete.

No error has been detected at Kew on examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	·0050
(2.) Mean difference irrespective of sign	·0017
(3.) Residual difference (Aberdeen—Kew)	−·0003

The mean monthly difference between simultaneous barograph and standard readings is 0·0020.

Armagh.—The Armagh barograph has been in good action and the photography has been good. The records are quite complete.

The following error has been detected at Kew and corrected:

In calculating residual correction—

April 30, +·022 should be +·019

Forty remeasurements have been made with the following results:

(1.) Greatest difference	·0050
(2.) Mean difference irrespective of sign	·0020
(3.) Residual difference (Armagh—Kew)	+·0001

The mean monthly difference between simultaneous barograph and standard readings is 0·0026.

Falmouth.—The action of the barograph at this station has been good during the month of April, and the photography has been good.

The hourly value for 11 a.m. of April 8 was lost on account of the lenses being cleaned, otherwise the records are complete.

The following errors have been detected at Kew and corrected:

In entry of standard readings—

April 17, 6 p.m., 30·070 should be 30·029

In calculating residual correction—

April 22–23 −·020 should be −·024
„ 23–24 −·024 „ −·021

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	·0050
(2.) Mean difference irrespective of sign	·0013
(3.) Residual difference (Falmouth−Kew)	+·0003

The mean monthly difference between simultaneous barograph and standard readings is 0·0021

Glasgow.—The barograph at this station has been in good action, and the photography has also been good during April.

The records are quite complete.

The following error has been detected at Kew and set right:

In calculating residual correction—

April 24–25 +·014 should be +·012

Forty remeasurements have been made with the following results:

(1.) Greatest difference	·0060
(2.) Mean difference irrespective of sign	·0019
(3.) Residual difference (Glasgow−Kew)	−·0005

The mean monthly difference between simultaneous barograph and standard readings is 0·0015.

Kew.—The action of the barograph at this observatory has been good, and the photography has been good during the month. There have been several failures of the gas, but in some instances the trace has been just discernible, and in these cases the curve has been pencilled over and readings taken. The trace is, however, altogether invisible on April 22d, 6 a.m. to 9 a.m., and again at 9 p.m.; in consequence five hourly values have been lost. In addition, one reading was lost on 16th through starting the cylinder in the wrong place.

The following errors were detected by examination of results:

In entry of standard readings—

April 7, noon, 29·089 should be 29·989

In calculating residual correction—

April 13–14, −·013 should be −·012

In applying residual correction—

April 15, 11 p.m., 30·384 should be 30·412
„ 20, 1 p.m., 29·983 „ 29·973

Forty remeasurements have been made with the following results:

(1.) Greatest difference	·0040
(2.) Mean difference irrespective of sign	·0018
(3.) Residual difference ($Kew^1 - Kew^2$)	−·0010

The mean monthly difference between simultaneous barograph and standard readings is 0·0022

Stonyhurst.—At this station the barograph has been in good action, and the photography has been good, with the exception of curve 99–100, which is very faint; the greater part of the trace has been pencilled over, and measurements made at Kew with ivory scale to the nearest hundredth; however, five hourly values are lost through the above curve; in addition, two hourly values were lost by failure of gas on April 21st, 4 and 5 a.m.

The following errors have been discovered and corrected at Kew:

In applying residual correction—

April 18, 9 a.m., 29·358 should be 29·858

In calculating residual correction—

April 10–11 +·004 should be +·005

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	·0050
(2.) Mean difference irrespective of sign	·0016
(3.) Residual difference (Stonyhurst−Kew)	+·0006

The mean monthly difference between simultaneous barograph and standard readings is 0·0014.

Valencia.—The Valencia barograph has been in good action throughout the month; the photography is good and the records complete.

The errors discovered and set right at Kew were as follows:

In entry of standard readings—

April 10, 10 a.m., 30·990 should be 29·990
„ 20, 10 a.m., 29·571 „ 29·560

In calculating residual correction—

April 30, −·014 should be −·013

Forty remeasurements have been made, giving:

(1.) Greatest difference - - - - -	·0040
(2.) Mean difference irrespective of sign - - -	·0017
(3.) Residual difference (Valencia—Kew) - - -	—·0003

The mean monthly difference between simultaneous barograph and standard readings is 0·0021

THERMOGRAPH.

Aberdeen.—The thermograph at this station has been in good action, and the photography has been good. On April 17 the gas was extinguished by the accumulation of water in the pipes, and in consequence 10 hourly values of both bulbs were lost, and also 10 on the succeeding day, from the same cause; otherwise the records are complete and devoid of error.

Forty remeasurements have been made at Kew with the following results, viz.:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·10	0·10
(3.) Residual difference (Aberdeen—Kew) - -	0·00	—0·06

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·17	0·16

Armagh.—The thermograph at this station has been in good action; the photography has been good and the records are complete, with one exception—at 9 p.m. on the 4th the wet bulb was out of action.

The following errors have been detected and corrected:

In tabulation—

April	7,	11 p.m.,	dry bulb,	45·0 should be	46·0
„	„	6 p.m.,	wet bulb,	48·6 „	46·6
„	„	11 p.m.,	„	43·0 „	42·5
„	24,	1 p.m.,	„	53·0 „	52·6
„	26,	3 p.m.,	„	44·6 „	43·6
„	27,	3 p.m.,	„	44·9 „	44·0
„	29,	11 a.m.,	dry bulb,	53·7 „	53·0
„	„	11 a.m.,	wet bulb,	50·5 „	50·0

It was also found necessary to retabulate at Kew curves for the following times:

Dry bulb,	April	6th, 11 a.m., to 7th, 10 a.m.
„	„	10th, 11 a.m., to 10th, midnight.
„	„	14th, 5 a.m., 9 a.m., and 11 a.m. to midnight.
„	„	20th, 11 a.m., to 21st, 10 a.m.
Wet bulb,	„	10th, 11 a.m., to 11th, 1 a.m.
„	„	15th, 9 a.m., 5 p.m., and 7 p.m.
„	„	18th, 11 a.m., to 20th, 10 a.m.

The original readings were made from incorrect scale settings.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·3	0 3
(2.) Mean difference irrespective of sign - -	0·15	0·11
(3.) Residual difference (Armagh—Kew) - -	+0·04	+ ·11

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·19	0·17

Falmouth.—The thermograph has been in good action during the month, and the photography is good. The records for the dry bulb are complete. The wet bulb was out of action for two hours on the 23rd, two on the 26th, and four on the 27th.

No error has been detected on examination.

Forty remeasurements have been made at Kew with the following results, viz.:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·2
(2.) Mean difference irrespective of sign - - -	0·11	0·08
(3.) Residual difference (Falmouth—Kew) - -	+0·06	+0·03

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·09	0·09

Glasgow.—The action of the thermograph at this station has been good during the month, and the photography has also been good. The records for the dry bulb are complete, as are also those for the wet bulb, with the exception of the 27th, when five hourly values were lost, the gas having failed.

The following error was detected at Kew and set right:

April 15th, 9 p.m., dry bulb, 52·4 should be 47·4

Forty remeasurements have been made with the following results, viz.:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - - -	0·13	0·12
(3.) Residual difference (Glasgow—Kew) - -	+0·03	—0·07

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·11	0·11

Kew.—The thermograph at this station has been in good action, and the photography is good. The instrument was cleaned on the 26th, and in consequence one hourly value of both bulbs was lost. With this exception the records of the dry bulb are complete. The wet bulb was out of action, through frost, three hours on the 2nd, two on the 4th, and two on the 6th.

No error has been detected by examination.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·2	0·2
(2.) Mean difference irrespective of sign - -	0·08	0·09
(3.) Residual difference (Kew[1]—Kew[2]) - -	—0·01	—0·08

The mean monthly difference between simultaneous barograph and standard readings is:

Dry.	Wet.
0·08	0·11

Stonyhurst.—The thermograph has been in good action during the month, and the photography is good. The only failure for the dry bulb was for one hour on the 4th, when the gas was out; there was also one hour of the wet bulb lost on the 4th, three on the 5th, and one on the 21st, from the same cause. Two hours on the 19th are rendered doubtful, the supply of water having failed.

No error has been detected on examination.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet
(1.) Greatest difference - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·10	0·08
(3.) Residual difference (Stonyhurst—Kew) - -	0·00	— 0·02

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·12	0·13

Valencia.—The thermograph has been in good action during the month, and the photography has also been good. The records for both bulbs are complete.

The following errors were discovered and corrected:

In entry of standard readings—

April 6th, 10 a.m., wet bulb, 57·8 should be 47·8

In tabulation—

April 9th, 3 a.m., dry bulb, 42·4 should be 43·0
„ 2nd, 2 p.m., wet bulb, 53·1 „ 54·1

It was found necessary to retabulate the dry bulb curve from 11 a.m. on the 4th to 10 a.m. on the 6th, and both curves from 11 a.m. on the 14th to 10 a.m. on the 16th; the original measurements having been made from incorrect scale settings.

A correction of —0·3 to the standard readings having been omitted on the 1st and 2nd April, all the readings for those days have been altered accordingly.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - -	0·2	0·0
(2.) Mean difference irrespective of sign - -	0·12	0·09
(3.) Residual difference (Valencia—Kew) - -	—0·07	+ 0·07

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·13	0·18

In the following Table the number of hourly records lost during the month of April is exhibited:

	Anemograph.		Barograph.	Thermograph.				
				Dry Bulb.	Wet Bulb.			
	Direction.	Velocity.			Out of action.	Frost.		Other causes.
						Lost.	Rendered doubtful.	
Aberdeen -	2	2	20	20	0	0	0	20
Armagh -	0	0	0	0	1	0	0	0
Falmouth -	0	3	1	0	8	0	0	0
Glasgow -	9	12	0	0	0	0	0	5
Kew - -	0	0	6	1	0	7	0	1
Stonyhurst -	0	0	7	1	2	0	0	5
Valencia -	0	0	0	0	0	0	0	0

A cheque was drawn for 10*l.* for petty cash.

The Committee then adjourned.

116, *Victoria Street, May* 23, 1870.

PRESENT:

Dr. W. A. Miller in the Chair.

Mr. De La Rue. | Mr. Gassiot.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, May 16, were read and confirmed.

Reported—That the letter adopted at last meeting had been forwarded to the Scottish Meteorological Society, and that a complete copy of the correspondence had been forwarded to the Board of Trade.

Read—A letter from the Board of Trade, enclosing a copy of the reply sent by that office to the Scottish Meteorological Society.

Read—A letter from M. Bass, Esq., M.P. (Minutes, p. 39); also a letter from G. Cunliffe, Esq., chairman of the Atlantic News Room, Liverpool, proposing to this Committee to furnish weather reports from certain new inland stations.

Mr. Scott reported that he had seen Mr. Scudamore on the subject, who had stated his readiness to supply the information required, daily, free of cost to this office, if the Committee would supply the requisite meteorological instruments.

Resolved—That this office will be prepared to issue a barometer rain gauge, wet and dry thermometer, and maximum and minimum thermometer, if required, to certain stations from which the Post Office are prepared to supply the information free of charge, on condition that the intelligence is communicated to this office for the purpose of checking its accuracy before issuing it to the public; Mr. Scott to settle details with Mr. Scudamore, and also to arrange, if practicable, for a distinct telegraph wire from the central office to this office.

Read—A letter from Mr. Scudamore respecting deflections on the telegraph lines, and asking the Committee to devise a scheme of observations on the subject.

Mr. Scott was instructed to reply that the subject has been and is under investigation at Greenwich, but that this office does not deal with it.

The Committee then adjourned.

116, *Victoria Street, May* 30, 1870.

PRESENT:

Dr. W. A. Miller in the Chair.

Mr. De La Rue. | Capt. Richards.

Mr. Gassiot. | Col. Smythe.

The Director was in attendance.

The Minutes of last meeting, May 23, were read and confirmed.

Reported—That the two letters to the Post Office, regarding Inland Stations and Earth Currents respectively, had been sent, as directed at last meeting.

Submitted—Proofs of the Annual Report for 1869.—Approved, with verbal alterations.

Resolved—That the Report be forwarded to the Board of Trade, for presentation to Parliament.

Mr. Scott reported that in the process of reproducing the instrumental records by means of the pantagraph, certain errors had been discovered, especially in the thermograms, which were probably due to incorrect standard readings. He was instructed to consult with Dr. Stewart as to the best means of obtaining a fiducial line on the thermograms.

Reported—That as the date at which the pantagraph was due from Berlin was now approaching, a letter had been written to Herr Wagner to ask how soon the instrument would be delivered in London.

Mr. Scott was instructed to arrange for its accommodation in the office temporarily.

Reported—That an additional computing clerk would be required to assist at the pantagraphic work.

Mr. Scott was authorized to engage a boy at weekly wages.

Read—A letter from Dr. Robinson, stating that additional expenditure was requisite, in order to fit his anemograph house for the reception of the new instrument.—Sanctioned.

Read—A letter from Capt. Toynbee, submitting logs kept by—

Capt. H. P. Wight, ship "Gosforth,"
Capt. Jas. Wylie, S.S. "Austrian,"

and recommending the latter for a copy of the Atlantic Pilot Charts. Capt. Wight has already received these charts (Minutes, 1869, p. 60), and the thanks of the Committee (Minutes, 1868, p. 60).

Resolved—That the pilot charts be presented to Capt. Wylie, and that Mr. Scott express to Capt. Wight the marked thanks of the Committee for his continued valuable co-operation in the work.

Mr. Scott reported that he had gone to Dover on the 24th inst. and had established the station. Mr. Jas. Costello is to be the reporting clerk. The instruments are erected on the premises of the South-eastern Railway Company, an annual charge of 10*s.* being paid to the company for the convenience thus afforded. Reports to begin June 1.

The following cheques were drawn:—

		£	*s.*	*d.*
For Office:				
R. H. Scott	Salaries and wages	66	13	4
J. S. Harding, jun.	Salaries and wages	15	0	0
J. S. Harding, sen.	Salaries and wages	*7	14	0
T. D. Bell	Salaries and wages	*3	6	0
Davey, Thompson, & Co., coals		2	6	0
For Observatories:				
T. Kerr, Valencia, salary for May		20	16	8
Standidge & Co., forms		12	6	6
S. Jeffery	Salaries and computations	*12	0	0
C. E. Burton	Salaries and computations	*7	0	0
E. Magrath	Salaries and computations	*5	12	0
J. P. Cutts	Salaries and computations	*3	0	0
For Telegraphy:				
F. Gaster	Salaries and computations	11	13	4
F. C. Steventon	Salaries and computations	7	10	0
F. Brodie	Salaries and computations	*3	12	0
G. G. Francis	Salaries and computations	*3	8	0
For Ocean Meteorology:				
H. Toynbee, Marine Superintendent		33	6	8
Negretti & Zambra	Instruments	34	13	3
Elliott, Brothers	Instruments	5	19	0
J. J. Hicks	Instruments	29	12	9
P. Adie	Instruments	24	1	6
J. D. Potter, pilot charts		6	0	0
W. Salmon	Salaries and computations	19	3	4
R. Strachan	Salaries and computations	†17	10	0
C. Harding	Salaries and computations	10	0	0
R. H. Curtis	Salaries and computations	8	6	8
J. A. Curtis	Salaries and computations	*5	12	0
W. G. James	Salaries and computations	*5	0	0
For Office Expenses, &c.:				
J. S. Harding, jun. (on account)		90	0	0
Total		£471	3	0

* Four weeks to 28th.

† Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, June* 6, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.

The Director was in attendance.

The minutes of last meeting, May 30, were read and confirmed.

Submitted—A letter from Herr Wagner, stating that the pantagraph would be ready by the end of June.

Submitted—A letter from Dr. Stewart, suggesting that fiducial lines might be obtained for the thermograms if holes were drilled in the screens at the points marked 80° and 20° respectively.

Mr. Scott was instructed to direct Mr. Beckley to alter the thermographs at Armagh and Valencia in accordance with the foregoing suggestion before his return to England.

Reported—That as the state of Mr. Burton's health would not permit of his remaining in London, he had resigned his clerkship.

The Committee then adjourned.

116, *Victoria Street, June* 20, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. Galton. | Mr. Spottiswoode.
Mr. Gassiot. | Col. Smythe.

The Director was in attendance.

The Minutes of last meeting, June 6, were read and confirmed.

Sir E. Sabine stated that he had lately received a letter from Dr. A. Keith Johnston respecting the possibility of establishing an observatory in the extreme north of Scotland, and that the Earl of Caithness had called on him suggesting St. John's Point, near Mey, as a suitable position for such an observatory.

Mr. Scott reported that at Sir E. Sabine's suggestion he had written to Lord Caithness, but as his Lordship had left town no reply had as yet been received.—Approved.

Submitted—The following report:—

GENTLEMEN, June 20, 1870.

I HAVE to report that I visited the telegraphic station at Yarmouth on the 9th inst., and found the instruments in good order. Mr. Robinson, the observer, has retired from the telegraph service on a pension, but as he is still resident in Yarmouth I propose to continue him in the post of observer, as I understand that the Post Office authorities will not offer any objection.

His allowance will be reduced from 10*s.* to 5*s.* weekly, as the extra sum was formerly sanctioned owing to the distance between the station where the observations are taken and that where the chief telegraphic business of the place is carried on.

I also visited the Sailors' Home, and saw the anemograph and Milne's barograph in action. I regret to say that I could not see any other site in Yarmouth which was likely to give a better exposure than the Sailors' Home, and that accordingly the discrepancy in velocity between easterly and westerly winds noticed, Minutes p. 40, seems to be unavoidable, at least at Yarmouth.—Approved.

Read—A letter (M.O. 1,032) from the Admiralty enclosing a report from Governor Rawson, of Barbadoes, relative to meteorological observations in that island, and asking the Committee "to favour their Lordships with any remarks which may occur to them "on the subject."

Mr. Scott was instructed to reply that, in the opinion of this Committee, the establishment of a system of meteorological observations in Barbadoes would be a most important and valuable measure, provided the superintendence were entrusted to a competent scientific man.

Submitted—An agreement for taking two rooms in the house No. 113, Victoria Street, for 18 months at an annual rent of 90*l.* (Minutes May 30).—Approved.

Reported—That Mr. Beckley had returned from Armagh, having erected the new anemograph, and altered the arrangements of the thermographs so as to show fiducial lines at 80° and 20° respectively. He would proceed to Valencia as soon as the fittings, &c., had been prepared in London.

Submitted—An account for certain items for Aberdeen observatory. Mr. Scott requested instructions for dealing with such accounts, and was directed to charge against the observatories all items which are not directly for outfit or for postage.

Submitted—Returns of a comparison between Mr. Galton's model anemograph and a full-sized instrument, which had been carried on at Kew (Minutes, pp. 4 and 12).

Submitted—A copy (nearly complete) of No. I. of the Quarterly Weather Report.

Resolved—That the price of each number for the year 1869 be 5*s*.

Read—A letter from Captain H. Toynbee, submitting "excellent" logs kept by—

Captain E. J. Blake, ship "Gilbert Thompson."
Captain John Bythesea, V.C., H.M.S. "Phœbe." (Log kept by Nav. Lieutenant J. A. R. Petch.)
Captain S. T. S. Lecky, S.S. "Halley."
Captain C. W. Reid, ship "Lord Strathnairn."

and recommending Captains Blake and Reid for presentation copies of the Atlantic pilot charts.

Resolved—That pilot charts be presented to Captains Blake and Reid, and that a letter be written to Captain Bythesea, requesting him to convey to Nav. Lieut. Petch the marked thanks of the Committee for his valuable observations.

Captain Lecky has been already mentioned in the Minutes (1868, p. 43), and received the pilot charts (1870, p. 6). Mr. Scott was instructed to thank him specially for this proof of his continued zeal for the science.

Reported—That a copy of the Daily Weather Report was supplied to Reuter's Telegram Company, Limited.

Submitted—The following report regarding the records for May 1870, received from the self-recording instruments of the various observatories, except Armagh, where a delay has occurred, which have been examined at Kew in accordance with the regulations adopted by the Meteorological Committee (see Minutes, December 21st, 1868).

Anemograph.

Aberdeen.—The anemograph has been in good action during the month of May, and the records for both direction and velocity are complete.

The following error was detected and set right at Kew:

In direction—

May 5th, 3 p.m., 1 should be 3.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·7
(3.) Residual difference (Aberdeen−Kew)	+0·1	+0·2

Falmouth.—The anemograph has been in good action, and the records are complete.

The orientation was tested on the 16th May and found correct.

The following error was detected at Kew, and corrected:

In direction—

May 24, 11 a.m., 29 should be 27.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·5
(3.) Residual difference (Falmouth−Kew)	−0·2	0·0

Glasgow.—At this observatory the anemograph has been in good action for the month of May, but the velocity trace continues occasionally to present a serrated appearance.

Nine hourly values of velocity, and eight of direction were lost on May 10th by stoppage of the clock, otherwise the records are complete.

The orientation was tested on the 25th, and found satisfactory.

The following errors were detected at Kew and set right:

In direction—

May 21st, 8 a.m., 20 should be 22.

In velocity—

May 12, 9 a.m., 16 should be 24.
„ 12, 10 a.m., 22 „ 30.
„ 24, 8 a.m., 38 „ 28.
„ 31, 7 p.m., 16 „ 26.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·1	0·7
(3.) Residual difference (Glasgow—Kew)	+0·1	0·0

Kew.—The anemograph has been in good action, and the records are complete.

The direction shaft became partly unclamped on the 12th May, and in consequence the values obtained for the direction on those two hours are somewhat doubtful.

The orientation was examined on May 28th and found correct.

No error has been discovered by examination.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·7
(3.) Residual difference (Kew^1—Kew^2)	0·0	−0·1

Stonyhurst.—The Stonyhurst anemograph has been in good action during the month, and the records are complete.

The orientation was tested on the 17th May and found correct.

No error has been discovered at Kew.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·4
(3.) Residual difference (Stonyhurst—Kew)	+0·1	0·0

Valencia.—With the exception of slight stiffness in the direction pencil, the action of the anemograph at this station has been good for the month, and the records are complete.

The following errors were detected at Kew and corrected.

In velocity—

May 26, 9 p.m., 32 should be 26.
„ 27, 3 a.m., 33 „ 23.

Forty remeasurements of direction and velocity have been made at Kew with the following results:

	Direction.	Velocity.
(1.) Greatest difference	1·0	2·0
(2.) Mean difference irrespective of sign	0·2	0·6
(3.) Residual difference (Valencia—Kew)	0·0	+0·1

Barograph.

Aberdeen.—The Aberdeen barograph has been in good action, and the photography has been good. The records are complete.

No error has been detected at Kew on examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0017
(3.) Residual difference (Aberdeen—Kew)	−0·0004

The mean monthly difference between simultaneous barograph and standard readings is ·0017.

Falmouth.—The action of the barograph and the photography have been good, and the records are complete.

No error has been detected at Kew on examination.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	·0050
(2.) Mean difference irrespective of sign	·0017
(3.) Residual difference (Falmouth—Kew)	+·0020

The mean monthly difference between simultaneous barograph and standard readings is ·0019.

Glasgow.—The barograph has been in good action, but the photography has been indifferent on several occasions, and from this cause the following hourly values have been lost:—Eight on the 17th, three on the 18th, and eight on the 22nd.

The following errors have been discovered at Kew and corrected:

In entry of standard readings—

May 9, mid., 28·837 should be 29·837
„ 12, 10 p.m., 29·844 „ 28·844
„ „ mid., 29·872 „ 28·872
„ 13, 10 a.m., 29·166 „ 29·116

In applying residual correction—

May 11, 8 p.m., 29·953 should be 28·953
„ „ 11 p.m., 29·883 „ 28·883
„ „ mid., 29·867 „ 28·867
„ 13, 7 a.m., 29·920 „ 29·020

May 12, 1 a.m., to 13, 6 a.m., 29 inches should be 28 inches throughout.

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0022
(3.) Residual difference (Glasgow—Kew)	—0·0008

The mean monthly difference between simultaneous barograph and standard readings is ·0020.

Kew.—The Kew barograph has been in good action through May, and the photography has been good. The records are complete.

The following error was found on examination of the results and set right:

In calculating residual correction—

May 21–22, —·012 should be —·015

Forty remeasurements have been made with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0018
(3.) Residual difference (Kew^1—Kew^2)	—0·0002

The mean monthly difference between simultaneous barograph and standard readings is ·0020.

Stonyhurst.—The Stonyhurst barograph has been in good action, and the photography has been good. The records are complete.

The following errors were detected at Kew on examination:

In applying residual correction—

May 11, 8 p.m., to midnight, 29 inches should be 28 inches throughout.

Forty remeasurements have been made with the following results:

(1.) Greatest difference	0·0060
(2.) Mean difference irrespective of sign	0·0028
(3.) Residual difference (Stonyhurst—Kew)	—0·0020

The mean monthly difference between simultaneous barograph and standard readings is ·0017.

Valencia.—The barograph has been in good action, and the photography has been good. The records are complete.

The following errors were discovered at Kew and corrected:

In entry of standard readings—

May 11, 10 a.m., to 10 p.m., 29 inches should be 28
„ 23, 2 p.m., 30·363 should be 30·313

In calculating residual correction—

May 1–2, —·014 should be —·013
„ 23–24, —·017 „ —·019

Forty remeasurements have been made at Kew with the following results:

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0018
(3.) Residual difference (Valencia—Kew)	—0·0004

The mean monthly difference between simultaneous barograph and standard readings is ·0023.

Thermograph.

Aberdeen.—The thermograph at this station has been in good action during May, and the photography has been good. The records for the dry bulb are quite complete, as are also those of the wet bulb, with the exception of two hours on the 16th, when it was out of action. The following error was discovered at Kew and put right: May 23rd, 2 a.m., wet bulb, 4·20 should be 42·8. It was also found necessary to retabulate throughout the dry bulb curve from May 12th, 11 a.m., till 14th, 10 a.m.; also the wet bulb curve from 18th, 11 a.m., till 20th, 10 a.m., the scale having been set in both cases to incorrect standard readings.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·2	0·3
(2.) Mean difference irrespective of sign	0·07	0·14
(3.) Residual difference (Aberdeen—Kew)	−0·03	+0·05

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·17	0·13

Falmouth.—The thermograph at this station has been in good action during May, and the photography has been good. One hourly value of both bulbs was lost on 3rd by stoppage of the clock, and the wet bulb was out of action on the following occasions, for one hour on the 1st, 2nd, 3rd, 5th, 9th, 16th; five hours on 22nd; four on 23rd; two on 26th; and one on the 31st; being a loss of 18 hours in all from this cause.

No errors have been detected.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·2	0·3
(2.) Mean difference irrespective of sign	0·11	0·08
(3.) Residual difference (Falmouth—Kew)	+0·01	+0·01

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·07	0·07

Glasgow.—The thermograph has been in good action during the month, and the photography has been good with one exception. The following hourly values have been lost: On the 12th, one of both bulbs by stoppage of the clock, and on the 31st, three of each from the same cause; on the 1st, one of the wet bulb from failure of the gas; one on the 15th, from a blemish; and seven on the 2nd, it being out of action.

The following error was corrected at Kew:

In tabulation—

May 5th, 1 p.m., wet bulb, 47·0 should be 48·1.

The dry bulb curve between 1 and 10 a.m. on 22nd was retabulated, the original readings having been made from incorrect scale settings.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·3
(2.) Mean difference irrespective of sign	0·14	0·13
(3.) Residual difference (Glasgow—Kew)	−0·09	−0·01

The mean monthly difference between simultaneous standard and tabulated readings:

Dry.	Wet.
0·13	0·13

Kew.—The thermograph has been in good action during the month, and the photography has been good. The dry bulb records are quite complete. The wet bulb was out of action on the following occasions: three hours on the 19th; two on the 21st; and three on the 22nd.

No errors have been discovered.

Forty remeasurements have been made with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·2	0·2
(2.) Mean difference irrespective of sign	0·07	0·09
(3.) Residual difference (Kew^1—Kew^2)	−0·06	−0·08

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·08	0·09

Stonyhurst.—The thermograph has been in good action during May, the photography has been good, and there are no blanks in the records of either bulb, nor has any error been detected at Kew.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference	0·3	0·2
(2.) Mean difference irrespective of sign	0·09	0·08
(3.) Residual difference (Stonyhurst—Kew)	−0·05	−0·03

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·11	0·12

Valencia.—The thermograph has been in good action during May, and the photography has been good. The records for both bulbs are quite complete.

The following errors have been detected at Kew and put right:

In entry of standard readings—

May	8th,	10 a.m.,	dry bulb,	51·4 should be	51·1
„	9th,	2 p.m.,	wet bulb,	50·8 „	51·8
„	„	4 p.m.,	„	51·8 „	51·1
„	10th,	4 p.m.,	dry bulb,	60·3 „	60·0
„	11th,	10 a.m.,	wet bulb,	43·9 „	53·9
„	„	noon	„	42·4 „	52·4

In maxima and minima—

May	1st,	Maximum	45·8	should be	50·8
„	11th	„	54·8	„	55·8
„	18th,	Minimum	53·0	„	52.4

The following curves were retabulated at Kew, the original measurements having been made from incorrect scale settings.

Dry bulb,	May	2nd,	11 a.m.	to	3rd,	midnight.
Wet bulb,	„	„	11 a.m.	„	4th,	10 a.m.
Dry bulb,	„	27th,	4 p.m.	„	28th,	10 a.m.
Wet bulb,	„	30th,	11 a.m.	„	31st,	10 a.m.

It has also been found necessary to erase several standard readings for both instruments during the month.

Forty remeasurements have been made at Kew with the following results:

	Dry.	Wet.
(1.) Greatest difference - - - - -	0·3	0·3
(2.) Mean difference irrespective of sign - -	0·10	0·17
(3.) Residual difference (Valencia—Kew) - -	—0·06	—0·08

The mean monthly difference between simultaneous standard and tabulated readings is:

Dry.	Wet.
0·13	0·16

In the following Table the number of hourly records lost during the month of May is exhibited:—

	Anemograph.		Barograph.	Thermograph.		
				Dry bulb.	Wet Bulb.	
	Direction.	Velocity.			Out of action.	Other causes.
Aberdeen - - - -	0	0	0	0	2	0
Armagh - - - -						
Falmouth - - - -	0	0	0	1	18	1
Glasgow - - - -	8	9	19	4	7	6
Kew - - - -	0	0	0	0	8	0
Stonyhurst - -	0	0	0	0	0	0
Valencia - - - -	0	0	0	0	0	0

The Committee then adjourned.

116, *Victoria Street, June* 27, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.
Mr. Galton. | Dr. Miller.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, June 20, were read and confirmed.

Reported—That the letter respecting observations at Barbadoes had been forwarded to the Admiralty, as directed at last meeting.

Reported—That the agreement for the rooms in the house, No. 113, Victoria Street, had been signed.—Approved.

Reported—That the second drill pantagraph would be sent in by Messrs. Beck early in July.

Resolved—That Part II. of the Quarterly Weather Report for 1869 be executed by lithography, similarly to Part I.

Reported—That Mr. R. H. Curtis, hitherto in the Marine Department, had been entrusted with the general superintendence of the pantagraphic work, and that Mr. J. W. M'Veagh had been engaged to assist in the Marine Department, at a salary of 12*s.* per week.

Reported—That the sum of 100*l.* (voted Minutes, 1869, p. 103), for the reduction of anemometrical records from Bermuda, Orkney, &c., at extra hours, had been expended.

Resolved—That a further sum of 50*l.* be devoted to the completion of the same work.

Submitted—The records from Armagh observatory for May 1870. *See* Minutes, June 20.

ANEMOGRAPH.

Armagh.—The anemograph at this station has been in good action from May 1st to 26th, and the records are complete. On the 27th it was dismounted by Mr. Beckley for the purpose of erecting a new instrument of the ordinary pattern as used at the other stations.

No errors have been found on examination.

Forty remeasurements of direction and velocity have been made at Kew with the following results:—

	Direction.	Velocity.
(1.) Greatest difference	1·0	1·0
(2.) Mean difference irrespective of sign	0·3	0·3
(3.) Residual difference (Armagh—Kew)	−0·1	+0·1

BAROGRAPH.

Armagh.—The Armagh barograph has been in good action during the month, and the photography has been very good.

The records are quite complete.

The following errors have been discovered at Kew and set right:—

In entry of standard readings—

May 11, 2 p.m., 29·834 should be 28·834
„ 12, 10 a.m., 29·588 „ 28·588

In calculating residual correction—

May 1, 1 a.m. to 2, 10 a.m., +·022 should be +·019
„ 18 to 19th, +·020 „ +·025

In tabulation, discovered by examination—

May 22, 10 a.m., 29·866 should be 29·876

Forty remeasurements have been made with the following results:—

(1.) Greatest difference	0·0050
(2.) Mean difference irrespective of sign	0·0019
(3.) Residual difference (Armagh—Kew)	+0·0002

The mean monthly difference between simultaneous barograph and standard readings is 0·0024.

Thermograph.

Armagh.—The instrument at this station has been in good action during May, the photography has also been good. The traces for both bulbs are quite complete.

The following errors have been detected at Kew:—

In tabulation—

Dry bulb,	May 4, 7 a.m.,	44·2	should be 45·2
Wet bulb	„ 2, 9 a.m.,	39·3	„ 38·8
„	„ 15, 11 a.m.,	49·1	„ 50·1
„	„ 16, 1 p.m.,	51·9	„ 50·9
„	„ 18, 2 p.m.,	55·0	„ 54·4
Dry bulb	„ 27, 11 p.m.	56·8	„ 55·8

In minimum—

May 1, 2.40 a.m., 41·7 should be May 1, mid., 38·4

Forty remeasurements have been made at Kew with the following results:—

	Dry.	Wet.
Greatest difference	0·3	0·3
Mean difference irrespective of sign	0·13	0·13
Residual difference (Armagh—Kew)	—0·08	—0·06

The mean monthly difference between simultaneous standard and tabulated readings is—

Dry.	Wet.
0·16	0·15

The following cheques were drawn:—

For Office:

			£	s.	d.
R. H. Scott	Salaries and wages		66	13	4
J. S. Harding, jun.			15	0	0
J. S. Harding, sen.			*7	14	0
T. D. Bell			*3	6	0
C. W. Jacques, rent for quarter		93 2 6			
Do. agreement, &c. for additional rooms		2 17 0			
			95	19	6

For Observatories:

B. Stewart, Kew—

Allowance to observatory		62 10 0			
Less anemograph forms		1 14 0			
		60 16 0			
Allowance for examination of records		100 0 0			
Erection of anemograph at Armagh		22 2 7			
Postages and petty expenses		6 18 11			
			189	17	6

D. Thomson, Aberdeen—

Allowance for quarter		62 10 0			
Less anemograph forms		1 14 0			
		60 16 0			
Postages and petty expenses		3 5 5			
			64	1	5
Carried forward		442 11 9	442	11	9

* Four weeks to 25th.

Brought forward			442 11 9
T. R. Robinson, Armagh—			
Allowance for quarter			33 15 0
Expenses „	7 15 11		
Fittings to anemograph	12 18 8		
		20 14 7	
R. Fox, Falmouth—			
Allowance for quarter	66 5 0		
Less anemograph forms	1 14 0		
		64 11 0	
R. Grant, Glasgow—			
Allowance for quarter	62 10 0		
Less anemograph forms	1 1 3		
	61 8 9		
Repairs to anemograph	3 17 6		
		65 6 3	
S. J. Perry, Stonyhurst—			
Allowance for quarter	50 0 0		
Less anemograph forms	1 14 0		
	48 6 0		
Postages and petty expenses	1 8 4		
		49 14 4	
Thomas Kerr, Valencia—			
Salary for June	20 16 8		
Expenses during quarter	48 7 7		
		69 4 3	
Hugh Williams, Holyhead—			
Allowance and expenses for quarter		4 0 4	
C. Clouston, Orkney—			
Allowance for quarter	2 10 0		
Expenses for past years	3 0 0		
		5 10 0	
G. T. Watson, Yarmouth—			
Allowance for quarter	3 15 0		
Postages and petty expenses	1 11 6		
		5 6 6	
R. & J. Beck, zinc plates, &c.		9 6 4	
L. P. Casella, dial anemometer		3 15 8	
J. Driscoll, rent at Valencia		25 0 0	
H. Hammond, erection of anemometer at Yarmouth		27 12 5	
R. W. Munro, anemometer fittings		10 17 0	
T. Tiller, packing cases, &c.		10 5 6	
S. Jeffery, E. Magrath, J. P. Cutts — Salaries and computations		*12 0 0 / *5 12 0 / *3 0 0	
For Telegraphy:			
John Grant—			
Allowance to Heart's Content		6 10 0	
F. Gaster, F. C. Steventon, F. Brodie, G. G. Francis — Salaries and computations		11 13 4 / 7 10 0 / 3 12 0 / 3 8 0	
Carried forward		900 16 3	

* Four weeks to 25th.

	Brought forward - - - -	900	16	3
For Ocean Meteorology:				
H. Toynbee, Marine Superintendent - - - -		33	6	8
L. P. Casella, instruments - - - - -		18	17	0
J. R. Jones, Aberdeen Agent - - - - -		1	18	11
J. D. Potter, pilot charts - - - - -		12	0	0
R. Rivière, binding do. - - - - -		6	6	0
W. Salmon - - - - - -		19	3	4
R. Strachan - - - - - -		*17	10	0
C. Harding — Salaries and computations - - -		10	0	0
R. H. Curtis — Salaries and computations - - -		8	6	8
J. A. Curtis - - - - - -		†5	12	0
W. G. James - - - - - -		†5	12	0
For Office Expenses:				
J. S. Harding, jun., on account - - - -		90	0	0
Total - -		£1,129	8	10

The Committee then adjourned.

* Including allowance for care of instruments.
† Four weeks to 25th.

116, *Victoria Street, July* 4, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Dr. Miller. | Admiral Richards.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, June 27th, were read and confirmed.

Submitted—The Report of the office for the year 1869, complete.

Read—A letter from Dr. Robinson, requesting permission to alter the distribution of the sum allotted for the payment of the supplementary assistant and the labourer, Minutes, 1868, p. 60; 1869, p. 63.

Permission granted.

Mr. Scott reported that a further supply of barometers was required for the Mercantile Marine account, and requested permission to transfer 16 broken barometers belonging to the Admiralty account to the Mercantile Marine account, at the estimated value of 1*l.* apiece.

The following are the numbers of the instruments:—A. 346, 347, 350, 352, 353, 354, 357, 358, 359, 362, 373, 374, 376, 377, 393, 394.

Transfer sanctioned.

Reported—That Mr. Potter had made application for a reprint of the Barometer Manual.

Mr. Scott was instructed to act on the Minute of June 15, 1868, and to prepare a new edition in the course of the autumn.

The question of lithographing the 12 monthly charts of Meteorological data for the western coast of South America (Minutes, p. 38) having been brought forward again, Admiral Richards stated that as the work was already completed, and did not entail further publications in the same form, he thought the charts might be published.

A cheque for 25*l.* was drawn in favour of Dr. Stewart, to defray the expenses of Mr. Beckley's journey to the different observatories.

The Committee then adjourned.

116, *Victoria Street, July* 18, 1870.

PRESENT:

Dr. W. A. Miller in the Chair.

Col. Smythe. | Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, July 4th, were read and confirmed.

Mr. Scott submitted the following report of his inspection of the southern stations:—

GENTLEMEN,

I VISITED the reporting station at Plymouth on the 5th inst. I found Mr. Pinchin, the former observer, still in charge of the station, but as he was to be removed on the 12th inst. the instruments were to be in future in charge of Mr. Collings, who has already had some experience in the duty of reporting.

The instruments have been removed to the post office, where there is no suitable situation for the thermometers or rain gauge. I have therefore instructed Mr. Collings to remove the latter to his own garden, at all events until better arrangements can be made.

The instruments are clean and in good order, but the register has not been carefully kept. I have directed the observer to pay more attention to this matter in future.

The reporting station at Penzance was visited on the 7th inst. The former observer, Mr. Senior, having been removed to Leeds, the observations are now taken by the postmaster, Mr. Uren. I found that he did not understand the mode of reading the barometer vernier to thousandths; in this I have instructed him. The barometers are at the post office, the thermometers in Mr. Uren's garden, to which place the rain gauge is to be removed.

On the whole I have every hope that Mr. Uren will make a good observer.

The station at Portsmouth was visited on the 9th. Mr. Hardy, the observer, has now been removed to the central office, High Street, Portsmouth, but the instruments still remain at the sub-office, on the Hard, Portsea. At this office there is no satisfactory position for the thermometers or rain gauge, which were formerly in Mr. Hardy's garden. Mr. Hardy takes the 8 a.m. observations himself, and I have directed him to find, if possible, a suitable position for the instruments in the neighbourhood of his own office.

The instruments are in good order, and the register well kept.

Inasmuch as I have found in each instance that serious changes had been made in the position of the instruments, and in the mode of conducting the observations since the telegraphic business has been handed over to the post office, I have addressed a letter to Mr. Scudamore, suggesting that if at any of our stations the performance of the duty of reporting in a satisfactory way was found to be incompatible with the duties of the telegraph clerks under the post office, this office should appoint its own observers at those stations entirely independently of the postal authorities, and should pay them direct, and not through the respective postmasters.

I have further to report that I inspected the observatory at Falmouth on the 6th inst. Mr. Dymond was absent on the continent, but Mr. Squire was at the observatory. All the instruments appeared to be in good order. The position of the thermographs is not good, as no proper exposure is obtainable on the premises of the observatory. This fact has already been noticed by Dr. Stewart (Minutes, 1868, p. 72).

ROBERT H. SCOTT.

Mr. Scott was instructed to write to the directors of each of the observatories, informing them that the self-recording rain gauges were nearly ready, and asking them to make arrangements to procure a suitable site for these instruments.

Read—A letter from Mr. Keith, factor to Lord Caithness, respecting the possible establishment of an observatory at St. John's Head (Minutes, June 20).

Consideration postponed until after Mr. Scott's visit to Caithness.

Submitted—A request from Falmouth observatory to have all tabulation forms, &c. supplied in duplicate.—Sanctioned.

Mr. Scott reported that the amount standing to the credit of the Committee on their current account in the Bank of England was nearly exhausted, but that he had not applied for a second imprest, inasmuch as the estimates might be expected to be passed shortly.

Resolved—That 1,000*l.* be transferred from the deposit account of the Committee to their current account.

Reported—That owing to an error on the part of the binders, the Quarterly Weather Report, Part I., was not yet ready for distribution.

The 12 monthly charts of meteorological data for the western coast of South America were ordered to be lithographed, with an explanatory preface.

SUBMITTED the following STATEMENT respecting the RECORDS for June 1870, received from the self-recording Observatories, and which have been examined at KEW OBSERVATORY (see Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		—		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		—		None.		None.		None.		One hourly value for direction and velocity.		One hourly value of direction.	
Orientation verified	June 25th correct.		—		June 13th correct.		24th correct.		3d correct.		June 28th correct.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	2·0			1·0	2·0	1·0	2·0	1·0	1·0	1·0	2·0	1·0	2·0
Mean difference irrespective of sign	0·4	0·5			0·0	0·6	0·1	0·0	0·1	0·6	0·3	+0·1	0·3	0·4
Residual difference (— Kew)	0·0	—0·1			0·0	0·0	0·6	—0·1	0·0	—0·1	0·5	—0·3	—0·3	—0·1
No. of errors discovered	None.	None.			None.	None.	1	2	None.	None.	None.	None.	None.	3
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Fair.		Good.		Fair.		Good.	
Records deficient	None.		None.		13 hours lost.		Nine hours lost.		None.		One hour lost.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	0·006		0·005		0·006		0·005		0·005		0·006		0·006	
Mean difference irrespective of sign	0·0015		0·0021		0·0020		0·0009		0·0019		0·0016		0·0023	
Residual difference (— Kew)	+0·0005		+0·0008		—0·0005		—0·0004		+0·0006		+0·0001		+0·0014	
Mean monthly difference between simultaneous barograph and barometer	0·0014		0·0025		0·0017		0·0014		0·0020		0·0015		0·0025	
No. of errors discovered in entry of standard	None.		1		1		2		None.		1		2	
„ in calculating residual correction	None.		2		1		1		None.		1		2	
„ in applying residual correction	None.		1		None.		None.		2		None.		8	
„ in tabulation	None.		7		None.		None.		None.		None.		None.	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	Six hours lost of wet bulb.		Nine hours lost of the dry bulb and 11 wet bulb.		Six dry bulb and 27 wet.		15 dry bulb, nine wet bulb.		25 hours lost for wet bulb.		One hour lost of the wet bulb.		Two hours dry bulb, two hours wet bulb.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·3	0·3	0·2	0·3	0·3	0·2	0·3	0·3	0·2	0·2	0·2	0.2	0·2	0·3
Mean difference irrespective of sign	0·12	0·12	0·08	0·09	0·11	0·09	0·11	0·13	0·05	0·08	0·09	0·10	0·09	0·11
Residual difference (— Kew)	+0·06	—0·01	+0·03	—0·02	+0·02	—0·01	—0·06	—0·13	0·00	—0·03	—0·01	0·00	—0·02	—0·07
Mean monthly difference between simultaneous thermograph and thermometer	0·15	0·16	0·19	0·17	0·08	0·06	0·14	0·13	0·11	0·13	0·12	0·13	0·18	0·17
No. of errors discovered in entry of standard	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	1
„ discovered by subsidiary measurements	None.	None.	7	1	None.	None.	1	1	None.	None.	None.	None.	None.	None.
„ maximum and minimum	None.	None.	2	—	None.	—	1	—	None.	—	None.	—	None.	—

In the following Table the number of hours lost during the month of June is exhibited.

—	Anemograph.		Barograph.	Thermograph.		
				Dry Bulb.	Wet Bulb.	
	Direction.	Velocity.			Out of Action.	Other Causes.
Aberdeen	0	0	0	0	0	6
Armagh	—	—	0	9	24	0
Falmouth	0	0	13	6	27	0
Glasgow	0	0	9	15	9	0
Kew	0	0	0	0	27	0
Stonyhurst	1	1	1	0	4	0
Valencia	1	0	0	2	2	0

Submitted the following statement of

ACCOUNTS PAID, AND LIABILITIES, to 30th June 1870.

—	Paid.	Estimated Liabilities.
	£ s. d.	£ s. d.
OFFICE :—		
Salaries	298 0 9	—
Rent, fuel, &c.	101 14 5	—
Contingencies	43 6 6	9 8 6
LAND METEOROLOGY :—		
Expenses at observatories	623 14 6	8 14 4
New instruments for ditto	91 19 4	506 10 0
Computations	152 9 9	—
Telegraphy	6 10 0	735 0 0
Inspections, &c.	24 1 11	—
Computations	113 10 6	—
OCEAN METEOROLOGY :—		
Marine superintendent	100 0 0	—
Instruments, Admiralty	1 14 2	5 0 0
Ditto Mercantile Marine	157 18 0	188 0 0
Computations and care of instruments	225 6 0	—
Totals	1,940 5 10	1,452 12 10

Grand Total - - £3,392 18*s.* 8*d.*

The Committee then adjourned.

116, *Victoria Street, July* 25, 1870.

PRESENT:

Dr. W. A. Miller in the Chair.

Mr. De La Rue. | Mr. Gassiot.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, July 18, were read and confirmed.

Reported—That replies had been received from the observatories, stating that suitable sites could be provided in each case for the self-recording rain gauges.

Read—A letter from Mr. Scudamore stating that the Post Office authorities would have no objection to the appointment by the Meteorological Office of observers at Portsmouth and Plymouth, who should be independent of the postmasters at those places.

Reported—That Mr. John Merrifield, F.R.A.S., Master of the Navigation School at Plymouth, had agreed to become meteorological reporter for that town.—Appointment sanctioned.

Resolved—That a new set of self-recording instruments, barograph, thermograph, anemograph, and rain-gauge, should be ordered, so that in case of an accident happening to any of the existing instruments their place should be at once supplied.

Read—A letter from the Colonial Office enclosing a letter from the Governor of South Australia, with copies of meteorological observations taken in that colony, and stating that Mr. Charles Todd, Superintendent of Telegraphs, "proposes for the future to "transmit his reports monthly direct to the Meteorological Department, under whose "auspices he is most anxious to have them published."

Mr. Scott was instructed to reply that the Meteorological Committee are not authorized to publish any observations made on land outside the area of the British Islands.

Read—A letter from Dr. Balfour Stewart stating that scale lines could be drawn at Kew on the photographic curves, so as to render them suitable for copying in the pantagraph. The expense would be 3*d.* per curve, or about 32*l.* per annum.—Arrangement sanctioned.

Reported—That Mr. Galton's new pantagraph had been erected at No. 113, Victoria Street.

Reported—That Herr Wagner's pantagraph might be expected to arrive in the course of the week, but that Herr Wagner himself could not leave Berlin at present, owing to the war.

Mr. De La Rue kindly volunteered to meet Herr Wagner on his arrival at the office, and make the necessary arrangements with him for setting the instrument to work. Mr. Scott having reported that through Mr. D. Pound, of Messrs. De La Rue's, he had ascertained that a man could be obtained to work the instrument at 2*l.* per week.

Mr. Scott was therefore instructed to proceed on his tour of inspection, as soon as the vote had been passed in the House of Commons, so as to return to London as early as he could in October.

Read—A letter from Capt. Toynbee, submitting an excellent log, kept by Capt. Clement Mossop, ship "Candahar," and recommending him for a presentation copy of the Atlantic Pilot Charts. Capt. Mossop has been a regular observer for the office for 12 years.

Resolved—That a copy of the Pilot Charts be presented to Capt. Mossop, and that Mr. Scott be instructed to thank him specially for his long and valuable services.

The following cheques were drawn:—

	£	s.	d.
For office salaries and wages:			
R. H. Scott	66	13	4
J. S. Harding, junr.	15	0	0
J. S. Harding, senr., 5 weeks to 30th	9	12	6
T. D. Bell „	4	2	6
For observatories (salaries, and computations):			
S. Jeffery, 5 weeks to 30th	15	0	0
R. H. Curtis	8	6	8
F. C. Steventon	7	10	0
E. Magrath, 5 weeks to 30th	7	0	0
J. P. Cutts „	3	15	0
T. Kerr, Valencia	20	16	8
For telegraphy (salaries, and computations):			
F. Gaster	11	13	4
F. Brodie, 5 weeks to 30th	4	10	0
G. G. Francis „	4	5	0
For ocean meteorology (salaries and computations):			
Captain H. Toynbee	33	6	8
W. Salmon	19	3	4
R. Strachan	*17	10	0
C. Harding	10	0	0
J. A. Curtis, 5 weeks to 30th	6	5	0
W. G. James „	6	5	0
J. W. M'Veagh, 5½ weeks to 30th	3	6	0
For office expenses:			
R. H. Scott, on account	75	0	0
J. S. Harding, junr., on account	50	0	0
	399	1	0

* Including allowance for care of Instruments.

The Committee then adjourned.

116, *Victoria Street, Oct.* 24, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.
Mr. Galton. | Admiral Richards.

Colonel Smythe.

The Director was in attendance.

The Minutes of last meeting, July 25, were read and confirmed.

Resolved—That the Members of the Committee are desirous to record on their Minutes their deep sense of the loss sustained by them in the death of their lamented coadjutor and Deputy-Chairman, the late Professor William Allen Miller.

Read the following Reports:

I HAVE to report that I have completed the inspection of all the telegraphic reporting stations and observatories. The entire tour occupied as much as five weeks. The date of my visit is given in each case.

Nairn (Aug. 13).—Everything was in good order with the exception of the wet bulb thermometer, which was rather dirty.

Aberdeen Aug. 15).—The barometers have been removed to the post office, but the other instruments are in Mr. Gibson's (the reporter's) garden. The station is satisfactory in all respects.

Wick (Aug. 16).—This station has only been established for a year. I found that the reporter, Mr. Sandison, the postmaster, understood his work very well, with the exception of the management of the maximum and minimum thermometers. This matter I explained to him, and I have no doubt that his station will prove a good one.

Thurso (Aug. 17).—This station only commenced work February 1st, 1870. The reporter is Mr. John Trotter, formerly a ship-carpenter, but now resident in the town. I was much pleased with the way in which he keeps his register, and can report that the station seems very satisfactory.

Leith (Aug. 19).—This station was, as usual, in very good order.

North Shields (Aug. 20.)—There has been a great change at this station during the year, Mr. Allaway having been removed, and Mr. Irvine appointed in his place. The instruments are now at the post office. The reading of the vernier was not thoroughly understood, but this has now been set right. There is a difficulty about obtaining a proper exposure for the thermometers and rain gauge, which are now placed in the back yard of the post office. I am endeavouring to have an improvement made in this matter. Mr. Irvine is anxious to learn his duties, and will I hope make a very good observer.

Ardrossan (Aug. 22).—This station was in good order; the barometers have been removed to the post office, but there is no other change to report.

Scarborough (Sept. 13).—This station continues very satisfactory.

Liverpool (Sept. 15).—The position of the instruments has been changed to the post office. The thermometers and rain gauge are in very bad positions, and I see no chance of improvement in this respect as long as the reports are sent from the town of Liverpool. The reporter, Mr. Jones, is very careful, but has not much spare time to attend to meteorological work.

Holyhead (Sept. 17).—The instruments at this station have been removed to the post office, where the exposure of the thermometers and rain gauge is not so satisfactory as it might be. The observer has been changed, a young clerk named Slater having been appointed in the place of Mr. Andrews, the former reporter. Mr. Slater seems intelligent, and anxious to do the work well, and I propose to continue him in the post of observer, at least for the present.

Greencastle (Oct. 3).—The reporter at this station has recently been changed, the present clerk in charge is named M'Gladery. His instruments are in good order, and he understands his duties well, so that I have every reason to hope that he will make a good observer.

Valencia (Oct. 8).—This station is satisfactory excepting as regards the position of the thermometers, for which a suitable exposure can hardly be procured.

Roche's Point (Oct. 11).—This station continues very satisfactory.

Crookhaven (Oct. 13).—This station was only established in the month of August in lieu of Cape Clear, with which island there is now no longer telegraphic communication. The reporter's name is J. Guilfoyle. I cannot say that at the date of my visit he understood his duties at all thoroughly. His thermometers were set up in their metal cases, the wet bulb being very imperfectly mounted, and the rain gauge only placed out in the open air when the observer expected rain!!! The readings were not taken punctually. The position of Crookhaven for wind observations is very bad. A high hill forms the north side of the harbour, the village is opposite to it but sheltered on the south by rising ground consequently there is a tendency in all winds felt there to blow either up or down the harbour, as there is an open channel for the wind along the valley which runs east and west. I am, therefore, very doubtful as to the advisability of retaining Crookhaven as a station at all, and I regret to say that to my knowledge there is no point on the south coast of Ireland which could with advantage be substituted for it. All the villages and small harbours with which there is telegraphic communication are very much sheltered. I visited Baltimore to satisfy myself as to the possibility of selecting it as a station, but I find that no observation of wind or sea could be made there without a walk of a mile.

St. Ann's Head (Oct. 17).—This station is in a very satisfactory condition, Mr. Walker, the reporter, being a careful observer. He has requested me to supply him with the daily weather reports.

In conclusion, I have to report that on the whole the stations are in good order and the registers well kept.

I have to inform you that telegraphic communication has now been opened with the Scilly Islands, and I understand that a wire will shortly be laid down to Stornoway. As soon as the latter extension shall have been made it will be of very great importance for the office to obtain reports from so distant a station on our exposed north-west coasts.

ROBERT H. SCOTT.

I HAVE to report that I visited the observatory of *Aberdeen* on the 15th of August. I found all the instruments in good order, with the exception of the standard dry thermometer, which had been unfortunately broken by Mr. Beckley when he was altering the thermographs so as to show fiducial lines. Professor Thomson used the standard thermometer usually employed as a wet bulb instrument, as a dry bulb standard, and consequently there are no standard readings for the wet thermogram for a few days, and the curve has been tabulated from the fiducial line.

The observatory of *Glasgow* was visited on the 22nd of August. Everything was in good order.

Stonyhurst was visited on the 12th of September. Everything was in good order.

Armagh was visited on the 1st of October; the instruments were all in good order. Dr. Robinson drew my attention to the fact that the gutters attached to the small building erected by the Committee were insufficient to carry off the rain which fell on it, and that a portion of the other premises of the observatory were damaged in consequence. The estimate for setting this matter to rights amounts to 1*l.* 15*s.* 0*d.*

Valencia, visited on the 8th of October. The observatory was in very good order. The assistant, Mr. C. Sullivan, has resigned his situation, and Mr. Sandiford is now being trained by Mr. Kerr to fill the vacant post.

I am glad to say that there will not be any difficulty in obtaining a proper exposure for the self-recording rain gauge at any of the observatories.

As regards wind observations, the exposure of the anemograph at Aberdeen is good, as the land is very level about it and reasonably free from trees. At Glasgow the observatory is situated on a slight rounded hill, so that the exposure is good, but the proximity of the mountains about Loch Lomond very probably affect the direction of the currents of air. At Stonyhurst the anemograph is placed in a large wooded park, in uneven ground, and with a range of hills rising at a distance of about six miles to the eastward. I therefore consider that this instrument is in a bad position to record velocity. At Armagh the country is wooded, and is very uneven, and although the observatory is situated on a hill, I feel sure that the velocity of the wind recorded at it falls very far short of its true value. At Valencia the observatory is situated close to the sea level, in as open a locality as is obtainable on that very mountainous coast.

I have further to report that Mr. Beckley has visited all the observatories in the course of the autumn.

With reference to the proposed establishment of an eighth observatory in the extreme north of Scotland, I went to Barrogill Castle to see the Earl of Caithness, and in company with his lordship and Mr. Keith, his factor, I went to the proposed site of the observatory on St. John's Point. This locality is very well exposed, but there is no house on it, and the probable cost of one would be about 500*l.* In the neighbourhood, however, at a place called West Canisby, there is a house available for the purpose of an observatory, the rent of this would be about 30*l.* The alterations requisite to be made would be similar to those required at Valencia. There is no person in the district who is fit to take the post of director.

ROBERT H. SCOTT.

Resolved—That Crookhaven be discontinued as a reporting station, and that Mr. Scott be instructed to make inquiries with reference to obtaining reports from the Scilly Islands and from Stornoway.

The tender for alterations at Armagh Observatory to the amount of 1*l.* 15*s.* was accepted.

Reported—That a new set of self-recording instruments had been ordered, in accordance with the instructions given at last meeting of Committee.

The question of the proposed establishment of an observatory in Caithness (Minutes, July 18) was postponed until next spring.

Reported—That on the 4th of August a letter had been received from the Board of Trade applying for certain returns regarding storm warnings for Col. Sykes. A reply had been sent by Capt. Toynbee.

Read—A letter from Mr. Scudamore (Minutes, p. 57), stating that the cost of direct telegraphic communication between Telegraph Street and the office would be 44*l.* per annum. Mr. Scott was instructed to make further inquiries, and report to the Committee.

Submitted—An application from the coastguard officer at Crookhaven for the loan of a fishery barometer for that station. Granted.

Reported—That the Rev. R. F. Wheeler had applied for meteorological observations

for the Tyneside Field Club from the reporter at North Shields, and that his application had been complied with. Approved.

Reported—That Wagner's pantagraph had arrived from Berlin at the end of July, and that Herr Wagner had himself arrived on the 19th of August and set up his instrument. Mr. Charles Stodart had been engaged at a salary of 2*l.* per week to work it, and had commenced operations on the 24th of August. Mr. De La Rue having been unable to attend personally to the superintendence of the execution of the work, he had engaged Mr. D. Pound to superintend the printing of the first plate for 5*l.* 5*s.* Approved.

Mr. Scott reported that the plates for Part II. of the quarterly weather report were completed, and that those for Parts III. and IV. were in an advanced stage.

Read—A letter from Sir Jas. Walker, Governor of the Bahamas (Minutes 1868, p. 54), applying for meteorological instruments for the nine lighthouses in that colony. Mr. Scott was authorized to supply four sets of instruments.

Permission was requested to allow the sum of 2*s.* 6*d.* per week to the person in charge of the anemograph at Bermuda, who has never received any special remuneration for his services. Sanctioned.

Reported—That the Marquis of Tweeddale had applied for a copy of any rainfall observations from Ascension which might be in the office, and that the information had been supplied. Approved.

Reported—That a new anemograph tabulating scale had been supplied to Kew Observatory, in place of one which had been broken. Mr. Scott was instructed to request the Observatory to pay for this instrument.

Read—A letter from Dr. Stewart respecting the retabulation of erroneous returns from the observatories, the labour of which had hitherto fallen on Kew. It was resolved that such returns should be sent back to the respective observatories for retabulation.

Submitted—Specimens of the charts of meteorological data for the west coast of South America.

Read—A letter from Capt. Toynbee recommending the following gentlemen for presentation copies of the Atlantic pilot charts:—

Capt. Thos. Donkin, Ship "Inverness."
Capt. David Gray, S.S. "Eclipse."
Capt. John Gray, S.S. "Mazinthien."
Capt. T. E. Hassell, Ship "Mervyn."
Capt. J. B. Kennedy, S.S. "Blue Cross."
Capt. D. E. Mackellar, Observations at Rapa Island.
Capt. John D'Arcy Morton, Ship "Henry Bath."
Mr. Fergus Scott, Chief Officer, S.S. "Hotspur."
Capt. John Stanhope, Ship "Decision."
Capt. John W. Tucker, Ship "John Temperley."

Resolved—That the pilot charts be presented to each of the above-named gentlemen.

Submitted also "excellent" logs kept by the following gentlemen, who have already received the pilot charts or the thanks of the Committee.

Capt. Robert Brown, S.S. "Moravian" (Minutes 1869, p. 113).
Log kept by Mr. J. F. Paterson, Chief Officer.

Capt. John Bythesea, V.C., H.M.S. "Phœbe."
Log kept by Nav. Lieut. J. A. R. Petch (Minutes 1870, p. 60).

Capt. Jas. Hayes, S.S. "Ptolemy" (Minutes 1869, p. 53, 1870, p. 38).
Capt. John A. Martyn, S.S. "Samaria" (Minutes, 1869, pp. 21, 61, 1870, p. 21).
Capt. W. H. Smith, S.S. "Hibernian" (Minutes, 1870, p. 1).

Mr. Scott was instructed to convey to these gentlemen severally the marked thanks of the Committee for their valuable observations.

Reported—That an application for Telegraphic Weather Intelligence from South Shields having been approved by the Board of Trade that station had been added to the list of places warned.

Reported—That a copy of the Daily Weather Report had been issued to—

A. B. Duckham, Sailors' Home, Falmouth.
J. C. Walker, St. Ann's Head Station.

SUBMITTED the following STATEMENT respecting the RECORDS for July, August, and September 1870, received from the self-recording Observatories, and which have been examined at KEW OBSERVATORY (see Minutes, 21st December 1868).

JULY.

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		*Fair.		Good.		Fair.		Good.		Good.		Fair.	
Records deficient	None.		None.		Four hours.		None.		None.		None.		2 direction. 7 velocity.	
Orientation verified	July 9th correct.		—		July 30th correct.		—		July 11th correct.		July 16th correct.		July 5th correct.	
Result of 40 *Remeasurements :—*	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	2·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·2	0·5	0·3	0·3	0·2	0·5	0·2	0·4	0·1	0·4	0·2	0·3	0·1	0·5
Residual difference (— Kew)	0·0	+0·2	—0·3	0·0	0·0	+0·1	0·0	0·0	0·0	—0·1	0·0	0·0	0·0	+0·2
No. of errors discovered	None.	None.	5	1	None.	None.	None.	None.	None.	None.	None.	None.	—	—
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Fair.		Defective.		Good.		Fair.		Good.		Good.		Good.	
Records deficient	None.		None.		20. Gas failed.		6.		None.		None.		None.	
Result of 40 *Remeasurements :—*														
Greatest difference	·006		·006		·006		·005		·004		·006		·006	
Mean difference irrespective of sign	·0021		·0024		·0021		·0015		·0019		·0019		·0019	
Residual difference (— Kew)	— 0002		·0000		+ ·0006		+ ·0004		·0000		—·0011		·0000	
Mean monthly difference between simultaneous barograph and barometer	—		—		—		—		—		—		—	
No. of errors discovered in entry of standard	None.		None.		None.		None.		None.		None.		None.	
„ in calculating residual correction	None.		1		4		1		2		None.		None.	
„ in applying residual correction	2		None.		None.		2		4		1		6	
„ in tabulation	None.		None.		None.		None.		None.		None.		None.	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Defective.		†Good.		Good.		Good.		†Good.		Good.	
Records deficient	4 wet.		4 wet.		16 dry, 18 wet.		1 wet.		3 dry, 2 wet.		4 dry, 15 wet.		27 dry, 28 wet.†	
Result of 40 *Remeasurements :*	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·30	0·30	0·30	0·30	0·30	0·30	0·30	0·20	0·20	0·20	0·30	0·30	0·20	0·20
Mean difference irrespective of sign	0·13	0·14	0·12	0·13	0·08	0·09	0·09	0·09	0·06	0·04	0·11	0·10	0·11	0·09
Residual difference (— Kew)	+0·04	+0·05	—0·04	—0·06	+0·05	+0·03	—0·08	+0·02	+0·02	—0·04	+0·01	—0·02	+0·01	—0·02
Mean monthly difference between simultaneous thermograph and thermometer	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of errors discovered in entry of standard	None.	1	1	1	None.	None.	None.	None.	None.	None.	None.	1	None.	1
„ discovered by subsidiary measurements	None.	2	15	4	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.
„ in maximum and minimum	None.	None.	1	—	1	—	None.	None.	None.	None.	None.	None.	—	1

* Armagh anemograms are from June 12th to July 31st inclusive.

† Thermometers dismounted for the purpose of adapting zero arrangement.

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		Aug. 25–26 15 hours of velocity.		None.		None.		None.		None.		None.	
Orientation verified	—		—		24th August.		6th August.		—		17th August.		—	
Result of 40 *Remeasurements :—*	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·3	0·6	0·4	0·3	0·2	0·5	0·3	0·5	0·2	0·4	0·4	0·5	0·2	0·7
Residual difference (—Kew)	0·0	—0·1	—0·3	0·0	—0·2	—0·2	0·0	0·0	+0·1	—0·3	+0·1	—0·2	0·0	+0·1
No. of errors discovered	One.	None.	4	None.	None.	None.	None.	1	None.	None.	None.	2	None.	2
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Fair.		Fair.		Fair.		Good.		Good.		Good.	
Records deficient	Aug. 6th one hour		Aug. 12–13 13 hours.		Aug. 5th nine hours.		None.		None.		None.		None.	
Result of 40 *Remeasurements :—*														
Greatest difference	0·005		0·006		0·005		0·0060		0·006		0·0040		0·005	
Mean difference irrespective of sign	0·0016		0·0029		0·0018		0·0019		0·0022		0·0017		0·0015	
Residual difference (—Kew)	+0·0003		+0·0014		+0·0005		0·0000		+0·0014		—0·0006		—0·0002	
Mean monthly difference between simultaneous barograph and barometer	0·0010		0·0030		0·0020		0·0016		0·0024		0.0012		0·0023	
No. of errors discovered in entry of standard	None.		1		None.		None.		None.		1		None.	
„ in calculating residual correction	None.		2		2		4		None.		None.		6	
„ in applying residual correction	None.		1		None.		1		1		1		8	
„ in tabulation	None.		2		None.		5		None.		1		4	
THERMOGRAPH :														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Indifferent.		Fair.		Good.		Good.		Fair.		Good.	
Records deficient	14 dry, 56 wet.*		13 dry, 14 wet.		13 dry, 12 wet.		39 dry, 31 wet.*		12 wet.		1 hour wet.		1 wet.	
Result of 40 *Remeasurements :—*	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Wet.	Dry.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·2	0·3	0·3	0·3	0·2	0·2	0·3	0·3	0·2	0·2	0·3	0·2	0·3	0·3
Mean difference irrespective of sign	0·09	0·07	0·14	0·16	0·07	0·09	0·11	0·11	0·07	0·06	0·13	0·10	0·11	0·12
Residual difference (—Kew)	—0·02	+0·01	—0·10	—0·15	—0·03	—0·03	+0·02	—0·02	—0.02	—0·05	—0·06	—0·07	—0·04	0·00
Mean monthly difference between simultaneous thermograph and thermometer	0·18	0·15	0·20	0·18	0·06	0·08	0·14	0·13	0·12	0·15	0·12	0·16	0·18	0·17
No. of errors discovered in entry of standard	None.	None.	1	None.	None.	None.	None.	None.	None.	None.	None.	None.	20	3
„ discovered by subsidiary measurements	None.	None.	2	3	None.	None.	None.	None.	None.	None.	None.	None.	None.	3
„ maximum and minimum	None.	None.	None.	None.	None.	None.	None.	None.	Nond.	None.	None.	None.	1 min.	1 min.

* Lost during construction of Zero arrangement.

† Partially lost during construction of Zero arrangement at Glasgow.

Points noticed at Kew.	Aberdeen.	Armagh.	Falmouth.	Glasgow.	Kew.	Stonyhurst.	Valencia.
ANEMOGRAPH :—							
Action	Good.	*Good.	Good.	Good.	Good.	Good.	Somewhat faulty.
Records deficient	None.	None.	None.	None.	None.	None.	20 direction, 2 velocity.
Orientation verified	Sept. 15th correct.	—	29th correct.	—	22d correct.	20th correct.	3d correct.
Result of 40 Remeasurements :—	Direction. Velocity.	Direction. Velocity.	Direction. Velocity.	Direction. Velocity.	Direction. Velocity.	Direction. Velocity.	Direction. Velocity.
Greatest difference	1·0 1·0	1·0 1·0	1·0 1·0	1·0 2·0	1·0 1·0	1·0 1·0	1·0 1·0
Mean difference irrespective of sign	0·1 0·5	0·2 0·3	0·0 0·4	0·1 0·6	0·2 0·3	0·1 0·3	0·3 5
Residual difference (— Kew)	0·0 —0·2	—0·1 0·0	0·0 —0·2	+0·1 0·0	—0·1 0·0	0·0 0·0	0·0 +0·1
No. of errors discovered	None. None.	4 1	None. None.	None. 1	None. None.	None. 1	6 16
BAROGRAPH :—							
Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Good.	Fair.	Good.	Good.	Good.	Good.	Fair.
Records deficient	None.	None.	None.	7 hours.	None.	None.	None.
Result of 40 Remeasurements :—							
Greatest difference	0·004	0·007	0·005	0·006	0·005	0·006	0·006
Mean difference irrespective of sign	0·0010	0·0028	0·0018	0·0021	0·0023	0·0021	0·0021
Residual difference (— Kew)	+0·0006	+0·0016	+0·0011	—0·0009	—0·0011	+0·0003	+0·0009
Mean monthly difference between simultaneous barograph and barometer	0·0010	0·0030	0·0020	0·0025	0·0020	0·0017	0·0022
No. of errors discovered in entry of standard	None.	None.	None.	None.	None.	None.	2
„ in calculating residual correction	None.	None.	3	None.	3	None.	1
„ in applying residual correction	3	None.	None.	2	None.	None.	1
„ in tabulation	None.	None.	None.	1	None.	None.	None.
THERMOGRAPH :—							
Action	Good.	Good.	Good.	Good.	Good.	Good.	Good.
Photography	Good.	Fair.	Good.	Fair.	Good.	Good.	Fair.
Records deficient	None.	1 hour wet bulb.	9 hours wet bulb.	None.	10 hours wet bulb.	9 hours wet bulb.	6 dry bulb, 19 wet bulb.
Result of 40 Remeasurements :—	Dry. Wet.	Dry. Wet.	Dry. Wet.	Dry. Wet.	Dry. Wet.	Dry. Wet.	Dry. Wet.
Greatest difference	0·3 0·3	0·3 0·3	0·2 0·2	0·2 0·3	0·2 0·2	0·2 0.3	0·2 0·3
Mean difference irrespective of sign	0·12 0·12	0·10 0·10	0·09 0·09	0·09 0·10	0·05 —0·03	0·09 0·10	0·10 0·13
Residual difference (— Kew)	+0·12 +0·05	—0·07 —0·09	—0·07 +0·02	0·00 0·00	—0·03 —0·01	+0·01 +0·03	+0·01 +0·06
Mean monthly difference between simultaneous thermograph and thermometer	0·17 0·15	0·15 0·17	0·07 0·08	0·13 0·12	0·11 0·11	0·12 0·14	0·16 0·17
No. of errors discovered in entry of standard	None. None.	None. None.	None. None.	None. None.	None. None.	None. None.	5 1
„ discovered by subsidiary measurements	1 2	None. None.	None. None.	None. None.	None. None.	None. None.	None. None.
„ maximum and minimum	None. None.	1 1	None. None.	None. None.	None. None.	None. None.	1 1
„ in tabulation	— —	2 2	— —	— —	— —	— —	— †—

* The direction pencil, however, does not trace satisfactorily during light winds.

† Two days dry bulb and four days wet bulb have been retabulated at Kew.

Mr. Scott reported that the vote had passed the House of Commons on the 2nd of August, and the Treasury order had been received on the 19th of August. 2,000*l.* had been lodged to the current account of the Committee in the Bank of England, and 6,000*l.* to their deposit account in the London and Westminster Bank. Approved.

The following cheques were drawn 30th August on the signature of Mr. De La Rue:—

			£	s.	d.
For Office:					
R. H. Scott	Salaries and wages		66	13	4
J. S. Harding, jun.			15	0	0
J. S. Harding, sen.			*7	14	0
T. D. Bell			*3	6	0
C. Dunning, office fittings			9	8	6
For Observatories:					
T. Kerr, Valencia			20	16	8
B. Stewart, Kew—					
Allowance for September quarter		62 10 0			
„ examination of records		100 0 0			
			162	10	0
R. and J. Beck, zinc plates			4	11	0
P. Adie, anemograph scales			2	0	0
W. Sugg, electrometer fittings			4	16	6
F. J. Wagner, pantagraph			188	0	0
S. Jeffery	Salaries and computations		*12	0	0
E. Magrath			*5	12	0
J. P. Cutts			*3	0	0
R. H. Curtis			8	6	8
F. Steventon			7	10	0
For Telegraphy:					
F. Gaster	Salaries and computations		11	13	4
F. Brodie			*3	12	0
G. G. Francis			*3	8	0
For Ocean Meteorology:					
H. Toynbee, salary for August			33	6	8
B. Stewart, Kew—					
Verifications, Admiralty		3 12 0			
„ Merchant marine		62 5 0			
			65	17	0
L. P. Casella, instruments			13	4	0
E. Higgs, packing cases			8	15	3
J. J. Hicks, instruments			26	4	0
H. J. Smart, Liverpool agent			15	2	1
W. Salmon	Salaries and computations		19	3	4
R. Strachan			†17	10	0
C. Harding			10	0	0
J. Curtis			6	7	0
W. G. James			6	7	0
J. W. Mc Veagh			2	8	0
For Office Petty Expenses:					
J. S. Harding, jun. (on account)			60	0	0
Total			£824	2	4

* Four weeks to 27th.

† Including allowance for care of instruments.

The following cheques were drawn 27th September on the signature of Admiral Richards :—

R. H. Scott -	Salaries and wages -	-	-	66 13 4
J. S. Harding, jun.	" " -	-	-	15 0 0
J. S. Harding, sen.	" " -	-	-	*9 12 6
T. D. Bell -	" " -	-	-	*4 2 6
C. W. Jacques, rent for quarter -	- -	93 2 6		
Do. rooms at No. 113 -	- -	22 15 3		
				115 17 9
Priest Bros., furniture - - - -		-	-	18 14 2
For observatories :				
D. Thomson, Aberdeen—				
Allowance for quarter - - - -		62 10 0		
Less anemograph forms - - - -		0 12 6		
				61 17 6
T. R. Robinson, Armagh—				
Allowance for quarter - - - -		33 15 0		
Expenses - - - - -		6 15 0		
Fixing ladder to anemograph - - -		2 11 6		
				43 1 6
W. P. Dymond, Falmouth—				
Allowance for quarter - - - -		66 5 0		
Less anemograph forms - - - -		0 12 6		
				65 12 6
R. Grant, Glasgow—				
Allowance for quarter - - - -		62 10 0		
Less anemograph forms - - - -		0 3 9		
				62 6 3
S. J. Perry, Stonyhurst—				
Allowance for quarter - - - -		50 0 0		
Less anemograph forms - - - -		0 12 6		
				49 7 6
T. Kerr, Valencia—				
Salary for September - - - -		20 16 8		
Expenses during quarter - - -		45 17 2		
				66 13 10
H. Williams, Holyhead—				
Allowance, &c., for quarter - - -		-	-	2 18 2
C. Clouston, Orkney—				
Allowance for quarter - - -		-	-	2 10 0
G. T. Watson, Yarmouth—				
Allowance for quarter - - - -		3 15 0		
Postages and expenses - - - -		9 7		
				4 4 7
Hughes & Kimber, pantagraph stores -	-	-	-	5 12 6
S. Jeffery - Salaries and computations	-	-	-	15 0 0
E. Magrath - " "	-	-	-	*7 0 0
J. P. Cutts - " "	-	-	-	*3 15 0
R. H. Curtis - " "	-	-	-	8 6 8
F. C. Steventon " "	-	-	-	7 10 0
C. Stodart - " "	-	-	-	*8 0 0
For Telegraphy :				
J. Merrifield, reporter at Plymouth -	-	-	-	2 5 0
F. Gaster - Salaries and computations	-	-	-	11 13 4
F. Brodie - " "	-	-	-	*4 10 0
G. G. Francis " "	-	-	-	*4 5 0
Carried forward -	-	-	-	666 9 7

* Four weeks to 1st October.

Brought forward			666	9 7
For Ocean Meteorology:				
H. Toynbee, Marine Superintendent			33	6 8
P. Feathers, Dundee Agent			2	10 0
D. McGregor, Glasgow do.			8	14 8
J. J. Hicks, thermometer screens	10 10 0			
Do. repairing "A" barometers	19 14 0			
			30	4 0
W. Salmon - Salaries and computations			19	3 4
R. Strachan - ,, ,,			†17	10 0
C. Harding - ,, ,,			10	0 0
J. A. Curtis - ,, ,,			*7	0 0
W. G. James - ,, ,,			*7	0 0
J. W. McVeagh ,, ,,			*3	0 0
For Office Expenses—				
J. S. Harding, jun., on account			70	0 0
Total			874	18 3

* Four weeks to 1st October.
† Including allowance for care of instruments.

Submitted the following statement of

ACCOUNTS PAID, AND LIABILITIES, to 30th September 1870.

	Paid.			Estimated Liabilities.		
	£	s.	d.	£	s.	d.
OFFICE :—						
Salaries	603	8	3		—	
Rent, fuel, &c.	217	14	9		—	
Contingencies	122	14	6	49	3	6
LAND METEOROLOGY :—						
Expenses at observatories	1,192	9	8	26	2	4
New instruments for ditto	294	9	10	555	13	8
Computations	341	11	9		—	
Telegraphy	8	15	0	1,030	16	0
Inspections, &c.	44	6	9	82	14	2
Computations	184	16	9		—	
OCEAN METEOROLOGY :—						
Marine superintendent	200	0	0		—	
Instruments, Admiralty	25	8	0	78	0	0
Ditto Mercantile Marine	316	7	1	240	2	6
Computations and care of instruments	436	11	6		—	
Totals	3,988	13	10	2,062	12	2

Grand Total - - £6,051 6*s.* 0*d.*

The Committee then adjourned.

116, *Victoria Street, October* 31, 1870.

PRESENT:

W. De La Rue, Esq., in the Chair.

Mr. Galton.	Colonel Smythe.
Sir E. Sabine.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, Oct. 24, were read and confirmed.

Mr. Scott was instructed to notify to the Council of the Royal Society that in consequence of the death of Dr. Miller there is a vacancy on the Meteorological Committee.

Read—A letter from Captain Toynbee, submitting an "excellent" log kept by Captain Heggum, ship "Czar," and recommending him for a presentation copy of the Atlantic Pilot Charts.—Approved.

Submitted—The following Report on the Comparison of an Anemometer, by F. Galton, Esq., F.R.S., &c., with the Kew Standard. (*Minutes, pp.* 4, 12, 60.)

An anemometer invented by F. Galton, F.R.S., having been placed near the Kew standard instrument, the indications of the two instruments between the 4th of April and the 18th June 1870, have been tabulated and carefully examined in the following manner:—

During the period mentioned the number of miles of wind which passed over Kew observatory, as registered by the Kew standard anemometer was 11,573, while Mr. Galton's instrument registered 10,171 miles. Assuming the former figures to be correct, there is a deficit of 1,402 miles by Mr. Galton's anemometer, or about 12 per cent. of the total number registered by the Kew standard.

In order to ascertain whether the anemometer under trial was sheltered in any direction, the aggregate number of miles registered by each instrument for every second point in the compass have been compared, and the result is given in the following table:

COMPARISON of Number of Miles of Wind registered simultaneously by the Kew Standard and Galton's Anemometer (from each two points of compass).

Points of the Compass.	Miles registered.		Per-centage.		Remarks.
	Kew.	Galton.	Galton's of Kew.	Loss by Galton's compared with Kew.	
North -	98	87	88·8	11·2	
N.N.E. -	651	538	82·6	17·4	
N.E. - -	160	138	86·3	13·7	
E.N.E. -	343	260	75·9	24·2	
East - -	1,151	873	75·8	24·2	
E.S.E. -	235	179	76·2	23·8	
S.E. - -	48	39	81·3	18·7	
S.S.E. -	82	68	82·9	17·1	
South -	293	251	85·7	14·3	
S.S.W. -	911	832	91·3	8·7	
S.W. - -	2,508	2,183	87·0	13·0	
W.S.W. -	1,338	1,241	92·8	7·2	Mr. Galton's just once registered more (by 5 m.) than the Kew.
West - -	2,046	1,913	93·5	6·5	
W.N.W. -	309	291	94·2	5·8	
N.W. -	733	672	91·7	8·3	
N.N.W. -	442	411	93·0	7·0	Ditto ditto by 4 miles.
Variables -	225	195	86·7	13·3	
Totals, &c. Averages -	11,573	10,171	86·2* 86·7	13·8 13·3	Average of definite directions. Do. variables.

* These values are the averages of the figures in the columns above them. The values obtained from the grand totals at the foot of cols. 2 and 3 are 88·0 and 12·0.

From this it appears that with easterly winds there is a deficit of about 24 per cent.; with northerly 11·5 per cent.; with westerly, about 6 per cent.; and with southerly, about 14·4 per cent.

From *all* directions, therefore, a deficit exists in the indications of Mr. Galton's anemometer, which is greatest with easterly and least with westerly winds; while with northerly and southerly the per-centage values differ but little considering the small number of miles registered from these directions. The average deficit from these two opposite points is about 13 per cent.

These figures require some explanation, as they may show one of two things:—

(1.) (Supposing the Kew standard to have been well exposed all round) that Mr. Galton's instrument was *much* sheltered to the eastward, less so to the northward and southward, and little (if at all) to the westward.

(2.) That the Kew standard was sheltered from the westward, while Mr. Galton's instrument was not; and the *latter* was sheltered from the easterly winds, while the Kew standard was not. In this case both instruments may be considered as well (or equally) exposed to northerly and southerly winds.

The following considerations tend to show the latter to be most probably the cause of the discrepancies above noted:—

1. The average per-centage of deficit from all points = 13·8
2. „ „ „ „ N. and S. = 13·0
3. „ „ „ for "variables" = 13·3
4. „ „ „ „ E. and W. = 14 or 15

(This latter is merely the numerical mean, and assumes that each instrument is sheltered to an equal extent, which is not certain.)

At any rate there appears reason to believe that Mr. Galton's instrument registers far less wind than the anemometer, which is considered as a standard instrument, and these figures show that the deficit is *about* 13 per cent.

An endeavour has been made to ascertain whether the deficiency increases with the velocity of the wind. The observations appear too few in number to give a good result; but so far as they go they show there is little, if any, variation under this head.

The following cheques were drawn:—

			£	s.	d.
For office:					
R. H. Scott	Salaries and wages		66	13	4
J. S. Harding, junr.	„ „		15	0	0
J. S. Harding, senr.	„ „		*7	14	0
T. D. Bell	„ „		*3	6	0
J. H. Parsons, office fittings			17	3	6
G. Taylor, gas fittings			18	3	6
For observatories:					
Hughes and Kimber, copper plates			5	14	3
R. and J. Beck, zinc plates		9 9 0			
„ pantagraph		101 18 6			
			111	7	6
T. Kerr, (Valencia) salary			20	16	8
D. Pound, engraving plates, &c.			5	5	0
S. Jeffery	Salaries and computations		*12	0	0
E. Magrath	„ „		*5	12	0
J. P. Cutts	„ „		*3	0	0
R. H. Curtis	„ „		8	6	8
F. C. Steventon	„ „		7	10	0
C. Stodart	„ „		*8	0	0
For telegraphy:					
R. H. Scott, inspections			7	14	2
J. W. Moore, translations			10	0	0
F. Gaster	Salaries and computations		11	13	4
F. Brodie	„ „		*3	12	0
G. G. Francis	„ „		*3	8	0
For ocean meteorology:					
H. Toynbee, marine superintendent			33	6	8
P. Adie, instruments			35	11	6
H. J. Smart, Liverpool agent			11	8	10
Carried forward			432	6	11

* Four weeks to 29th October.

		£	s.	d.
Brought forward	- - - - -	432	6	11
W. Salmon	Salaries and computations - - -	19	3	4
R. Strachan	" " - - -	†17	10	0
C. Harding	" " - - -	10	0	0
J. A. Curtis	" " - - -	*5	12	0
W. G. James	" " - - -	*5	12	0
J. W. M'Veagh	" " - - -	*2	8	0
For office expenses:				
J. S. Harding, junr., on account	- - - -	80	0	0
Total	- - - - -	£572	12	3

† Including allowance for care of Instruments.
* Four weeks to 29th October.

The Committee then adjourned.

116, *Victoria Street, November 7*, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Mr. Gassiot.
Mr. Galton.	Admiral Richards.

The Director was in attendance.

The Minutes of last meeting (October 31st) were read and confirmed.

Reported—That the Royal Society had been informed of the vacancy on the Committee.

Reported—That the seven self-recording rain-gauges on Beckley's principle were now complete (Minutes, p. 21), and that as soon as a supply of paper for them had been procured they would be despatched to the observatories.

Read—The following letter from Mr. Galton:—

I wish to propose to the Committee that they should order an instrument, at a cost, say, not exceeding 20*l.*, to be constructed *to convert our anemograms into curves of wind velocity*, that is to say, into curves whose abscissæ would be the present time-scale, and whose ordinates would represent the wind's velocity at each moment.

The instrument I have designed consists of an axis A, to move the paper, another, B, to move the pointer, and a third, C, to move the pencil which draws the required curve. A single handle M moves *both* A and B, which are geared together by a wheel connected with C, whose endlong movement causes the velocity ratio between the movements of A and B to vary.

Consequently by turning M with one hand, and another handle N, which is attached to C, with the other, the pointer can be made to travel onwards in any desired slope, and therefore to follow the anemogram, while the pencil will trace the required curve.

Resolved—That Mr. Galton's proposal be adopted, and that a sum not exceeding 25*l.* be placed at his disposal for the construction of such an instrument.

Read—A letter from Captain Toynbee submitting an "excellent" log kept by Capt. C. T. Raymond, ship "British Consul."

Captain Raymond having already received the Pilot Charts, Minutes 1869, p. 90, Mr. Scott was instructed to convey to him the marked thanks of the Committee.

Mr. Scott reported that he had ascertained that there was a fair prospect of having good meteorological observations taken on the Scilly Islands, and that he understood that the Scilly Telegraph Company would make a considerable reduction in their tariff for meteorological reports. He was authorized to establish a telegraphic reporting station in the Scilly Islands.

Reported—That a copy of the Daily Weather Report had been supplied to the Rev. F. A. Malleson, Barrow-in-Furness.

The Committee then adjourned.

116, *Victoria Street, Nov.* 21, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. Galton. | Mr. Spottiswoode.

The Director was in attendance.

The minutes of last meeting (Nov. 7) were read and confirmed.

Read—A letter from Mr. Louis J. Crossley, of Halifax, (Minutes, 1867, p. 88,) requesting a supply of the forms, &c. used at the observatories, and stating his readiness to forward to the office copies of his observations, with the tabulations of his self-recording instruments.

Mr. Scott was instructed to thank Mr. Crossley for his proposed co-operation, to supply the forms, and to request to be supplied with duplicate copies of the photographic records.

Submitted—A memorandum respecting the corrections supplied for hydrometers from Kew. Mr. Scott was instructed to send 12 old instruments to be re-verified, in order to see if they had undergone any change.

Mr. Galton exhibited a model of his proposed machine for converting the velocity traces of the anemograph into continuous curves.

Submitted—The following letter :—

21st November 1870.

I propose to the Committee that they should sanction the construction of yet another instrument, for the purpose of making a tracing of the *Vapour Tension*, to replace in our publications the tracing of the wet-bulb thermometer.

The principle of the instrument I propose is, that while the photogram is made to travel onwards, one pointer shall follow the tracing of the dry bulb whose ordinate is t, and another pointer, that of the wet bulb, whose ordinate is t^1; the latter movement t^1 causes a small frame to move laterally, and the difference between the two movements, $t - t^1$, causes a waggon on that frame to move backwards and forwards. The waggon carries a "relief," about the size of a small envelope, which has been fashioned in the way I shall shortly explain, whose vertical height at every point is equal to the vapour tension corresponding to its values of t and $t - t^1$. This relief would give an up-and-down movement to a style resting vertically above it, which would be connected with the pencil that is to draw the required trace.

The relief would be constructed from the figures in an ordinary psychrometrical table, such as Glaisher's, in the following way:—A number of thin zinc plates would be taken, one for each degree Fahrenheit, t^1, and successive ordinates would be drawn upon them for successive tabular values of t-t^1. A curve would be drawn with a free hand, running through these points, the zinc would be cut out according to this curve, and the whole set of plates so obtained would be packed together and secured side by side. Wax would then be smeared over them, and the surface moulded until it was perfectly continuous and smooth, after which a thick electrotype in copper would be taken from it. This would form the required relief. Considerable accuracy could be obtained by cutting out the curves in thin card and using these as templates, whence Wagner's pantagraph would scratch reduced curves on the zinc.

(Signed) FRANCIS GALTON.

Submitted—A correspondence with Mr. Whipple, of Kew Observatory, respecting a paper on some points in the weather of October last, which he proposed to publish. Mr. Scott's reply stated that the office could not sanction the discussion of unpublished data from the observatories by any of the staff at Kew.

Mr. De la Rue, to whom the matter had been referred, had concurred in the view taken by Mr. Scott.—Action approved.

Read—A letter from Captain Toynbee, submitting an excellent log kept by Captain T. C. Potts, ship "Tenasserim." This gentleman has already received the pilot charts. (Minutes, 1870, p. 6.) Mr. Scott was instructed to convey to Captain Potts the marked thanks of the Committee for his valuable observations.

Reported—That the daily weather reports had been supplied to the Rev. F. Smith, Moville, County Donegal, Ireland.

Resolved—That as the Committee understand that Captain Toynbee proposes to join the eclipse expedition, he be permitted to take an extra fortnight's leave.

The Committee then adjourned.

116, *Victoria Street, November* 28, 1870.

PRESENT:

Mr. Spottiswoode in the Chair.

Mr. Galton. | Mr. Gassiot.

The Director was in attendance.

The Minutes of last meeting (November 21) were read and confirmed.

Reported—That a copy of the Daily Weather Report had been supplied to Mr. A. Sutherland, Carrickfergus.

Reported—That Commander Brent, R.N., had applied for certain information respecting fogs in the English Channel, which had been furnished to him.—Approved.

The following cheques were drawn:—

				£	s.	d.
For Office:						
R. H. Scott	Salaries and wages			66	13	4
J. S. Harding, jun.	,,	,,		15	0	0
J. S. Harding, sen.	,,	,,		*7	14	0
T. D. Bell	,,	,,		*3	6	0
Davey, Thompson, and Alder, coals				13	16	0
For Observatories:						
R. and J. Beck, zinc plates				4	18	0
R. Beckley, inspections				9	11	0
T. Kerr (Valencia) salary				20	16	8
Malby and Sons, anemograph forms				6	10	0
S. Jeffery	Salaries and computations			*12	0	0
E. Magrath	,,	,,		*5	12	0
J. P. Cutts	,,	,,		*3	0	0
R. H. Curtis	,,	,,		8	6	8
F. C. Steventon	,,	,,		7	10	0
C. Stodart	,,	,,		*8	0	0
For Telegraphy:						
F. Gaster	Salaries and computations			11	13	4
F. Brodie	,,	,,		*3	12	0
G. G. Francis	,,	,,		*3	8	0
For Ocean Meteorology:						
H. Toynbee, marine superintendent				33	6	8
Elliott Brothers "A" instruments			5 17 0			
Do. M.O.	,,		2 18 0			
				8	15	0
W. Salmon	Salaries and computations			19	3	4
R. Strachan	,,	,,		†17	10	0
C. Harding	,,	,,		10	0	0
J. A. Curtis	,,	,,		*5	12	0
W. G. James	,,	,,		*5	12	0
J. W. McVeagh	,,	,,		*2	8	0
For Office Expenses:						
J. S. Harding, jun., on account				80	0	0
Total				£393	14	0

The Committee then adjourned.

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* Four weeks to 26th November.

† Including allowance for care of instruments.

116, *Victoria Street, December* 5, 1870.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Col. Smythe.
Mr. Galton. | Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, November 28, were read and confirmed.

Mr. Scott was instructed to inform the Board of Trade that the amount required by the Committee for the year 1871–2 would be 10,000*l.*, being the same sum as that voted for the present year.

Resolved—That the following detailed estimate be printed on the Minutes:—

Estimate for year 1871–2.

	£	*s.*	*d.*	£	*s.*	*d.*
Office:						
Salaries	1,250	0	0			
Rent and fuel	500	0	0			
Office expenses	250	0	0			
				2,000	0	0
Land Meteorology:						
Expenses of observatories	2,200	0	0			
Do. new instruments	450	0	0			
Computations	700	0	0			
Telegraphy	2,000	0	0			
Do. computations	450	0	0			
Inspections	150	0	0			
				5,950	0	0
Ocean Meteorology:						
Marine Superintendent	400	0	0			
Instruments, Admiralty	250	0	0			
Do. Mercantile Marine	500	0	0			
Computations	900	0	0			
				2,050	0	0
Total				£10,000	0	0

Part II. of the Quarterly Weather Report was submitted to the Committee.

Mr. Galton reported that several trials had been made with a model of the instrument proposed by himself, to convert the anemograms into curves of wind velocity, and that the working of the model presented no difficulty, but that there was a practical objection to its use, owing to the very slight difference in inclination between lines in the anemogram which represented very important differences of high wind velocity. He therefore thought that a plan suggested by Mr. De La Rue of so dividing the anemograms that the trace of each successive hour should begin afresh from a common base line would be the more suitable, especially as he had found it easy to carry the plan into effect by means of the pantagraphs.

Various experimental traces were exhibited.

A discussion having ensued relative to the form of publication of the Instrumental Records proposed by Mr. Galton, it was resolved provisionally—

A. That the method proposed by Mr. De La Rue for representing hourly wind velocity be adopted.

B. That Mr. Beckley be instructed to report on the feasibility of making the original trace, furnished by the instrument, accordant with the new plan of representation.

C. That the rain be represented in a similar manner to the wind, as rate of fall per hour.

D. That curves of hourly vapour tension be inserted in addition to the wet and dry bulb thermograms.

Mr. Scott was instructed to prepare specimen plates in accordance with the foregoing resolutions, and submit them to the Committee.

SUBMITTED the following STATEMENT respecting the RECORDS for October 1870, received from the self-recording Observatories, and which have been examined at KEW OBSERVATORY (see Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Fair.		Good.		Good.		Good.		Good.		Somewhat indifferent.	
Records deficient	None.		None.		None.		None.		4 velocity.		None.		30 direction. 23 velocity.	
Orientation verified	—		—		Oct. 26th correct.		Oct. 24th correct.		Oct. 25th correct.		Oct. 24th correct.		Oct. 1st correct.	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·2	0·7	0·3	0·4	0·1	0·5	0·1	0·5	0·2	0·3	0·2	0·5	0·2	0·6
Residual difference (— Kew)	0·0	0·0	−0·2	0·0	+0·1	−0·1	−0·1	−0·1	0·0	−0·2	0·0	−0·3	+0·1	+0·1
No. of errors discovered	1	None.	None.	None.	None.	1	1	2	None.	None.	None.	None.	1	25
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Fair.		Defective.	
Records deficient	23		None.		1		1		None.		1		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	·005		·007		·006		·006		·006		·006		·005	
Mean difference irrespective of sign	·0013		·0020		·0019		·0023		·0017		·0021		·0020	
Residual difference (— Kew)	·000		+·0006		−·0016		−·0011		−·0010		−·0006		−·0004	
Mean monthly difference between simultaneous barograph and barometer	—		—		—		—		—		—		—	
No. of errors discovered in entry of standard	None.		1		2		None.		1		1		5	
,, in calculating residual correction	None.		None.		2		None.		1		None.		1	
,, in applying residual correction	None.		None.		None.		None.		1		2		1	
,, in tabulation	None.		3		None.		None.		None.		6		3	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Defective.	
Records deficient	None.		16 dry, 18 wet.		36 wet.		3 wet.		None.		2 wet.		9 dry, 50 wet.	
Result of 40 *Remeasurements* :	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·20	0·20	0·20	0·20	0·10	0·20	0·20	0·20	0·20	0·20	0·20	0·20	0·20	0·20
Mean difference irrespective of sign	0·06	0·07	0·07	0·09	0·07	0·07	0·09	0·09	0·06	0·04	0·09	0·10	0·10	0·09
Residual difference (— Kew)	+0·03	+0·04	−0·05	−0·05	−0·02	−0·03	−0·06	−0·01	0·00	−0·01	−0·01	−0·10	−0·08	−0·01
Mean monthly difference between simultaneous thermograph and thermometer	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of errors discovered in entry of standard	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	11	7
,, discovered by subsidiary measurements	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.
,, in maximum and minimum	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	None.	3	—
,, in tabulation	None.	None.	*None.	None.	None.	None.	1	†None.	None.	None.	2	None.	‡1	17

* One day dry bulb and two days wet bulb re-tabulated at Kew.

† Two days wet bulb re-tabulated at Kew.

‡ Two days dry bulb and two days wet bulb re-tabulated at Kew.

The Committee then adjourned.

116, *Victoria Street, December* 19, 1870.

PRESENT :

Sir E. Sabine in the Chair.

Mr. De La Rue.	Mr. Gassiot.
Mr. Galton.	Colonel Smythe.

The Director was in attendance.

The minutes of last meeting (Dec. 5) were read and confirmed.

Read—A letter from Mr. Scudamore (Minutes, p. 75) stating that the Post Office would consent to reduce the annual charge for a direct telegraphic wire from Telegraph Street to the office to 22*l.*

Mr. Scott was instructed to accept the offer and complete the arrangements.

The discussion as to the form of publication of the instrumental records having been resumed, it was resolved—

I. That Mr. Beckley be authorised to make experiments, with the view of obtaining wind traces of velocity, to commence at each hour from a common base line; expense not to exceed 20*l.*

II. That Mr. Galton be requested to have a model constructed to draw the curves of vapour tension from the two thermograms (Minutes, Nov. 21). Expense not to exceed 20*l.*

III. That the hourly vapour tension be calculated for all the observatories for the year 1870, and that curves representing it be inserted on the plates.

IV. That the anemograms from Sandwick, Holyhead, and Yarmouth be not reproduced at present.

Mr. De La Rue volunteered to make experiments with the view of ascertaining the feasibility and the cost of producing scale plates containing the standing portion of the plates in the Quarterly Weather Report.

Submitted—A proof of the Barometer Manual (Minutes, p. 68), which was adopted, subject to corrections; the title page to bear the words "Compiled by direction of the Committee."

Submitted—A register from H.M.S. "Phœbe," Captain J. Bythesea, V.C., which had been kept by Nav.-Lieutenant J. A. R. Petch. This register was fully equal to the two former ones kept by the same officer (pp. 60, 76); and Mr. Scott was instructed to convey to Captain Bythesea the marked thanks of the Committee for these very valuable observations.

Mr. Scott submitted a circular which he proposed to issue to the authorities at the various ports at which the drum is not at present hoisted, drawing their attention to the Wreck Return, and to the fact that warning of the most destructive gale in 1869, that of October 19th, had been issued by the office on the previous day.—Approved.

Reported—That Mr. J. Park Harrison had applied for a copy of the daily mean temperature for 1869, for Kew and Aberdeen, which had been furnished to him.

Resolved—That the sum of 2,000*l.* be transferred from the deposit account of the Committee to their current account in the Bank of England.

The following cheques were drawn :—

For Office:				£	*s.*	*d.*
R. H. Scott	Salaries and wages			66	13	4
J. S. Harding, junr.	,,	,,		15	0	0
J. S. Harding, senr.	,,	,,		*9	12	6
T. D. Bell	,,	,,		*4	2	6
C. W. Jacques, rent, No. 116			93 2 6			
,, No. 113			22 15 3			
				115	17	9
Carried forward				211	6	1

* Five weeks to 31st.

	£	s.	d.
Brought forward - - -	211	6	1
For Observatories, Quarterly Allowances, &c.:			
D. Thomson, Aberdeen - - - - -	62	10	0
T. R. Robinson, Armagh - - - - -	33	15	0
Do. Expenses during quarter - - - -	9	9	0
W. P. Dymond, Falmouth - - - - -	66	5	0
R. Grant, Glasgow - - - - - -	62	10	0
H. Williams, Holyhead - - - - -	2	17	10
B. Stewart, Kew - - - - - 62 10 0			
Less forms supplied, September - 0 12 6			
„ Anemograph scale - - 1 0 0			
1 12 6			
60 17 6			
Examination of records - - - 100 0 0			
Sundries as per account - - - 63 16 3			
Standard thermometer - - - 2 0 0			
	226	13	9
C. Clouston, Orkney - - - - - -	3	15	2
S. J. Perry, Stonyhurst - - - - 50 0 0			
Less waxed paper supplied - - - 6 10 4			
	43	9	8
T. Kerr, Valencia, Salary for December - - -	20	16	8
Do. Expenses during quarter - - - -	51	6	9
G. T. Watson, Yarmouth - - - - -	3	19	0
J. Driscoll, rent at Valencia - - - - -	25	0	0
E. Stanford, advertisements - - - - -	10	5	0
Hughes and Kimber, copper plates - - - -	11	2	9
T. Adie - Scales, &c. - - - - -	5	2	0
L. P. Casella „ „ - - - - -	3	10	0
S. Jeffery - Salaries and computations - - -	*15	0	0
E. Magrath „ „ - - - -	*7	0	0
J. P. Cutts „ „ - - - -	*3	15	0
R. H. Curtis „ „ - - - -	8	6	8
F. Steventon „ „ - - - -	7	10	0
C. Stodart „ „ - - - -	*10	0	0
For Telegraphy:			
S. M. Clare, Submarine Co.—			
March - - - - - - 29 8 11			
April - - - - - - 25 19 3			
May - - - - - - 27 8 9			
June - - - - - - 27 0 9			
July - - - - - - 23 14 3			
August - - - - - 24 1 6			
September - - - - - 21 16 9			
	179	10	2
J. Costello, Dover - - - - - -	†3	5	0
J. Grant, Heart's Content, six months - - - -	6	10	0
W. D. Penny, Nairn - - - - - -	†4	4	6
J. Merrifield, Plymouth - - - - -	†3	5	0
J. Trotter, Thurso - - - - - -	†3	5	0
T. Robinson, Yarmouth - - - - -	†3	5	0
C. Diver, repairs to signal staff, Yarmouth - - -	2	14	9
F. Gaster - Salaries and computations - - -	11	13	4
F. Brodie „ „ - - - -	*4	10	0
G. G. Francis „ „ - - - -	*4	5	0
Carried forward - - - -	1,131	13	1

* Five weeks to 31st.
† Thirteen weeks to 31st.

				£	s.	d.
	Brought forward			11,131	13	1
For Ocean Meteorology:						
H. Toynbee, marine superintendent				33	6	8
J. J. Hicks, "A" instruments		19 11 6				
„ Instruments, &c.		14 8 4				
				33	19	10
B. Stewart, Kew, "A" verifications		16 10 0				
„ "M.O." „		17 19 0				
				34	9	0
E. Stanford, advertisements				5	9	9
H. J. Smart, Liverpool agent				7	19	5
J. R. Jones, Aberdeen „				6	3	5
W. Salmon - Salaries and computations				19	3	4
R. Strachan „ „				*17	10	0
C. Harding „ „				10	0	0
J. A. Curtis „ „				†7	0	0
W. G. James „ „				†7	0	0
J. W. McVeagh „ „				†3	0	0
For Office Expenses:						
J. S. Harding, jun., on account				80	0	0
	Total			£1,396	14	6

* Including allowance for care of instruments.
† Five weeks to 31st.

SUBMITTED—The following STATEMENT respecting the RECORDS for November 1870 received from the self-recording Observatories, and which have been examined at Kew Observatory (See Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Fair.		Good.		Good.		Good.		Fair.		Fair.	
Records deficient	23 hours D. and V.		None.		6 hours velocity. Novr. 25th.		None.		None.		17 hours velocity Novr. 27.		2 hours direction.	
Orientation verified	—		—				—		—				—	
Result of 40 *Remeasurements :—*	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	2·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	2·0
Mean difference irrespective of sign	0·4	0·5	0·3	0·4	0·2	0·6	0·2	0·6	0·1	0·3	0·3	0·6	0·3	0·6
Residual difference (—Kew)	0·0	0·0	0·0	+0·1	—0·1	+0·1	+0·2	—0·2	+0·1	0·0	—0·1	—0·4	—0·1	+0·2
No. of errors discovered	0	0	2	0	0	0	0	0	0	0	1	0	1	7
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Fair.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		None.		None.		None.		None.		3 hours.		None.	
Result of 40 *Remeasurements :—*														
Greatest difference	·0050		·0050		·0060		·0060		·0060		·0060		·0060	
Mean difference irrespective of sign	·0016		·0021		·0023		·0019		·0018		·0024		·0026	
Residual difference (—Kew)	+·0004		+·0001		—·0002		+·0002		+·0002		—·0016		—·0008	
Mean monthly difference between simultaneous barograph and barometer	·0015		·0028		·0020		·0023		·0021		·0013		·0023	
No. of errors discovered in entry of standard	0		0		0		0		0		0		1	
„ in calculating residual correction	0		0		0		0		0		0		0	
„ in applying residual correction	0		0		0		0		0		0		16	
„ in tabulation	0		0		0		0		0		2		0	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	11 wet.		2 wet.		5 wet.		1 dry, 12 wet.		12 wet.		13 wet.		None.	
Result of 40 *Remeasurements :—*	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	3	3	3	2	2	2	2	2	1	1	2	3	2	3
Mean difference irrespective of sign	·08	·08	·11	·10	·07	·06	·10	·09	·05	·05	·09	·08	·10	·11
Residual difference (—Kew)	+·05	+·04	+·01	+·06	—·01	+·03	—·05	+·02	·00	—·01	—·03	—·04	·00	—·01
Mean monthly difference between simultaneous thermograph and thermometer	·11	·13	·12	·14	·07	·08	·11	·11	·10	·11	·11	·12	·13	·12
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	2	6
„ discovered by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ in maximum and minimum	0	0	0	0	0	0	0	0	0	0	0	0	2	3
„ in tabulation	*0	0	2	3	†	†	0	0	0	0	0	0	‡	0

* A correction of +0·6 has been applied to all the dry bulb readings through the month on account of error of standard.
‡ 1½ day dry retabulated at Kew.
† 1½ day dry and 1 day wet retabulated at Kew.

The Committee then adjourned.